FACULTY OF AGRICULTURE

SYLLABUS

For

B.Sc. AGRICULTURE (Hons.)

(Semester: I–VIII)

Session: 2018-19

KHALSA COLLEGE AMRITSAR-143001

B.Sc. Agriculture (Hons.)
SEMESTER-I

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment **	*** Grand Total
			Th	Prac	Th	Prac		
1.	FSC-111	Fundamentals of Horticulture	3	3	25	12	13	**50**
2.	PBG-112	Fundamentals of Genetics	4	3	37	19	19	**75**
3.	SSC-113	Fundamentals of Soil Science	4	3	37	19	19	**75**
4.	FOR-114	Introduction to Forestry	3	3	25	12	13	**50**
5.	AGR-115	Fundamentals of Agronomy	6	3	50	25	25	**100**
6.	EXT-116	Rural Sociology and Educational Psychology	4	0	37	0	13	**50**
7.	BOT-117 MAT-117	Introductory Biology/ Elementary Mathematics	3 4	3 0	25 37	12	13 13	**50**
8.	AGH-118	Agricultural Heritage	1	0	19	0	6	**25**
9.	ENG-119	Communication Skills in English	4	0	37	0	13	**50**
10.	GPB-1110/ BPB-1110	Punjabi (Compulsory) / Basic Punjabi (Mudhli Punjabi)	4	0	37	0	13	**50**
11.	HVE-1111*	Human Values and Ethics	2	0	19	0	6	**(NC)**
12.	SOA-101*	*Drug Abuse: Problem, Management and Prevention (Compulsory)	2	0	37	0	13	**(NC)**
		Total	**40/41**	**18**	**331/ 343**	**97**	**147**	**575**

Note:

1. Mathematics for those students who have passed 10+2 (Medical)
2. Biology for those students who have passed 10 +2 (Non Medical)
3. Basic Punjabi (Mudhli Punjabi) for those students who have not passed 10+2 with Punjabi subject.

*NC- Non Credited.

**Internal Assessment = (60% of MST + 15 % of Attendance + 25% of Academic Activity).

*** Allotment of marks of each course is on the basis of credit hours specified by ICAR (5th Deans' Committee Report, 2016)

B.Sc. Agriculture (Hons.)

SEMESTER-II

Sr. No	Course Code	Subject	Periods per Week		Marks		Int. Assessment **	*** Grand Total
			Th.	Prac.	Th.	Prac.		
1.	BCT-121	Fundamentals of Plant Biochemistry and Biotechnology	4	3	37	19	19	**75**
2.	MBL- 122	Agricultural Microbiology	3	3	25	12	13	**50**
3.	SWE-123	Soil and Water Conservation Engineering	3	3	25	12	13	**50**
4.	BOT-124	Fundamentals of Crop Physiology	3	3	25	12	13	**50**
5.	AGE-125	Fundamentals of Agricultural Economics	4	0	37	0	13	**50**
6.	PPL-126	Fundamentals of Plant Pathology	6	3	50	25	25	**100**
7.	ENT-127	Fundamentals of Entomology	6	3	50	25	25	**100**
8.	EXT-128	Fundamentals of Agricultural Extension Education	4	3	37	19	19	**75**
9.	ENG-129	Communication Skills in English	4	0	37	0	13	**50**
10.	GPB-1210 /BPB-1210	Punjabi (Compulsory) / Basic Punjabi (Mudhli Punjabi)	4	0	37	0	13	**50**
11.	SOA-102*	Drug Abuse: Problem, Management and Prevention (Compulsory)	2	0	37	0	13	**(NC)**
		TOTAL	**41**	**21**	**362**	**122**	**166**	**650**

Note: Basic Punjabi(Mudhli Punjabi) for those students who have not passed 10+2 with Punjabi subject.

***Note: The marks of Drug Abuse: Problem, Management and Prevention (Compulsory) will not be added in the total marks.**

****Internal Assessment** = (60% of MST + 15 % of Attendance + 25% of Academic Activity).

*** Allotment of marks of each subject is on the basis of credit hours specified by ICAR (5th Deans' Committee Report, 2016)

B.Sc. Agriculture (Hons.)

SEMESTER-III

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment**	Grand Total
			Th	Prac.	Th.	Prac.		
1.	AGR-211	Crop Production Technology-I (Kharif Crops)	3	3	40	20	15	**75**
2.	PBG-212	Fundamentals of Plant Breeding	4	3	40	20	15	**75**
3.	AGE-213	Agricultural finance and Co-operation	4	3	40	20	15	**75**
4.	AGI-214	Agricultural Informatics	3	3	40	20	15	**75**
5.	AEN-215	Farm Machinery and Power	3	3	40	20	15	**75**
6.	VSC-216	Production Technology for Vegetables and Spices	3	3	40	20	15	**75**
7.	LPM-217	Livestock and Poultry Management	4	3	40	20	15	**75**
8.	STA-218	Statistical Methods	3	3	40	20	15	**75**
9.	DMT-219	Disaster Management	3	0	35	0	15	**50**
10.	ESL-220	Environmental Studies	6	3	60	20	20	**100**
		Total	**36**	**27**	**360**	**180**	**135**	**750**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

B.Sc. Agriculture (Hons.)

SEMESTER-IV

Sr. No	Course Code	Subject	Periods per Week		Marks		Int. Assessment **	Grand Total
			Th	Prac	Th.	Prac		
1.	AGR-221	Crop Production Technology-II (Rabi Crops)	3	3	40	20	15	**75**
2.	FSC-222	Production technology for Ornamental Crops, MAP and Landscaping	3	3	40	20	15	**75**
3.	AEN-223	Renewable energy & Green Technology	3	3	40	20	15	**75**
4.	SSC- 224	Problamatic Soils and their Management	4	-	40	-	10	**50**
5.	FSC-225	Production Technology for Fruits and Plantation crops	3	3	40	20	15	**75**
6.	PBG-226	Principles of Seed Technology	3	3	40	20	15	**75**
7.	AGR-227	Farming System and Sustainable Agriculture	3	0	40	--	10	**50**
8.	AGE-228	Agricultural Marketing, Trade and Prices	4	3	40	20	15	**75**
9.	AGM-229	Introductory Agro-meteorology and Climate Change	3	3	40	20	15	**75**
10.	(Elective-I) PCV-2210 BPF-2210 CPB-2210	(Any one option) Protected Cultivation Biopesticides & Biofertilizers Commercial Plant Breeding	4	3	40	20	15	**75**
	Total		**35**	**24**	**400**	**160**	**140**	**700**

***Note: The marks of Environmental Studies will not be added in the total marks.**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

B.Sc. Agriculture (Hons.)

SEMESTER-V

Sr. No.	Course	Subject	Period Per week		Marks		Internal assessment**	Grand Total
			Th.	Prt.	Th.	Prt.		
1.	AGR-311	Practical Crop Production-I *(Kharif Crops)*	0	4	0	40	10	**50**
2.	PPL-312	Principles of Integrated Pest and Disease Management	4	3	40	20	15	**75**
3.	SSC-313	Manure, Fertilizer and Soil Fertility Management	4	3	40	20	15	**75**
4.	ENT-314	Pests of crops and Stored Grain and Their Management	4	3	40	20	15	**75**
5.	PPL-315	Diseases of Field and Horticulture Crops and their Management-I	4	3	40	20	15	**75**
6.	PBG-316	Crop Improvement (Kharif)	3	3	40	20	15	**75**
7.	AGE-317	Entrepreneurial Development and Business Communication	3	3	40	20	15	**75**
8.	AGR-318	Geoinformatics and Nano-Technology and Precision Farming	3	3	40	20	15	**75**
9.	IPR-319	Intellectual Property Rights	3	0	40	--	10	**50**
10.	(Elective-I) PCV-3110 BPF-3110 CPB-3110	(Any one option) Protected Cultivation Biopesticides & Biofertilizers Commercial Plant Breeding	4	3	40	20	15	**75**
11.	(Elective-II) ACH-3111 SPW-3111 AWM-3111	(Any one option) Agrochemicals Soil, Plant, Water and Seed Testing Agricultural Waste Management	4	3	40	20	15	**75**
12.	HVE-1111*	Human Values and Ethics	2	0	40		10	**(NC)**
		Total	**38**	**31**	**400**	**200**	**150**	**775**

***Note: The marks of "Human Values and Ethics" will not be added in the total marks.**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

B.Sc. Agriculture (Hons.)

SEMESTER-VI

Sr. No.	Course	Subject	Period Per week		Marks		Int. Assessment **	Grand Total
			Th.	Prt.	Th.	Prt.		
1.	AGR-321	Practical Crop Production-II *(Rabi)*	0	4	0	40	10	**50**
2.	AGR-322	Rainfed Agriculture and Watershed Management	3	3	40	20	15	**75**
3.	AEN-323	Protected Cultivation and Secondary Agriculture	3	3	40	20	15	**75**
4.	PPL-324	Diseases of Field and Horticulture Crops and their Management-II	4	3	40	20	15	**75**
5.	FSC-325	Post Harvest Management and Value Addition of Fruits and Vegetables	3	3	40	20	15	**75**
6.	ENT-326	Management of Beneficial Insects	3	3	40	20	15	**75**
7.	PBG-327	Crop Improvement (Rabi)	3	3	40	20	15	**75**
8.	AGR-328	Principles of Organic Farming	3	3	40	20	15	**75**
9.	AGE-329	Farm Management, Production and Resource Economics	3	3	40	20	15	**75**
10.	FST-3210	Principles of Food Science and Nutrition	4	0	40	0	10	**50**
11.	BIT-3211	Principles of Plant Biotechnology	2	2	25	15	10	**50**
12.	(Elective-III) ABM-3212 WMG-3212 LSP-3212	(Any one option) Agri-business Management Weed Management Landscaping	4	3	40	20	15	**75**
	Total		**35**	**33**	**425**	**215**	**160**	**825**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

B.Sc. Agriculture (Hons.)

SEMESTER VII

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment **	Grand Total
			Th.	Pract	Th.	Pract		
1.	FSC-411	Nursery Management of Horticultural Crops	4	3	80	40	30	150
2.	FSC-412	Fundamentals of Fruit Production	4	3	60	20	20	100
3.	VSC-413	Commercial Vegetable Production	4	6	80	40	30	150
4.	VSC-414	Vegetable Breeding and Seed Production	4	6	80	40	30	150
5.	TPR	Training Project Report	--	--	-	--	--	150
		Total	**16**	**18**	**300**	**140**	**110**	**700**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

B.Sc. Agriculture (Hons.)

SEMESTER VII

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment**	Grand Total
			Th.	Pract	Th.	Pract.		
1.	AGR 411	Weed Management	4	6	80	40	30	150
2.	AGR-412	Crop Production under Special Situations	4	-	80		20	100
3.	SSC-413	Analytical Techniques in Soils, Plants, Fertilizers and Water	4	6	80	40	30	150
4.	FOR-414	Production Technology of Economic Forest Trees	4	6	80	40	30	150
5.	TPR	Training Project Report	--	--	--	--	--	150
		Total	**16**	**18**	**320**	**120**	**110**	**700**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

B.Sc. Agriculture (Hons.)

SEMESTER-VII

ELECTIVE – AGRICULTURAL ECONOMICS
(Agril. Economics, Extension Education & Agri- Business Management)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment**	Grand Total
			Th	Pract	Th	Pract		
1.	EXT-411	Communication and Information Technology	4	6	80	40	30	150
2.	MGT-412	Financial and Project Management	4	6	80	40	30	150
3	EXT-413	Behavioral Skills for Human Resource Development	4	0	80	--	20	100
4.	AGE-414	Micro Economic Analysis	4	6	80	40	30	150
5.	TPR	Training Project Report	--	--	--	--	--	--
		Total	**16**	**18**	**320**	**120**	**110**	**700**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

SEMESTER VII

B.Sc. Agriculture (Hons.)

ELECTIVE -CROP PROTECTION
(Entomology, Plant Pathology & Nematology)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment**	Grand Total
			Th.	Pract	Th.	Pract		
1.	ENT-411	Apiculture	4	6	80	40	30	150
2.	PPL-412	Post Harvest Diseases and their Management	4	6	80	40	30	150
3.	ENT-413	Quarantine in Plant Protection	4		80		20	100
4.	NEM-414	Plant Nematology	4	6	80	40	30	150
5.	TPR	Training Project Report	--	--	--	--	--	150
		Total	**16**	**18**	**320**	**120**	**110**	**700**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

B.Sc. Agriculture (Hons.)

SEMESTER VIII

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment **	Grand Total
			Th.	Pract	Th	Pract		
1.	FSC-421	Commercial Fruit Production	4	6	80	40	30	150
2.	FSC-422	Processing and Value Addition of Horticultural Crops	4	6	60	20	20	100
3.	VSC-423	Forcing Techniques in Vegetable Production	4	6	60	20	20	100
4.	FCL-424	Commercial Floriculture and Landscaping	4	6	80	40	30	150
5.	TPR	Training Project Report	--	--	--	--	--	150
		Total	**16**	**24**	**280**	**120**	**100**	**650**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

B.Sc. Agriculture (Hons.)

SEMESTER VIII

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment**	Grand Total
			Th.	Pract	Th	Pract		
1.	AGR-421	Farming Systems and Sustainable Agriculture	4	6	80	40	30	150
2.	SSC-422	Soil Physical and Biological Environment	4	6	80	40	30	150
3.	SSC-423	Soil Survey, Classification and Mapping	0	6	--	40	10	50
4	AGR-424	Production Technology of Spices, Aromatic, Medicinal and Plantation Crops	4	6	80	40	30	150
5.	TPR	Training Project Report	--	--	--	--	--	150
		Total	**12**	**24**	**240**	**160**	**100**	**650**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

B.Sc. Agriculture (Hons.)

SEMESTER VIII

ELECTIVE -- AGRICULTURAL ECONOMICS
(Agril. Economics, Extension Education & Agri- Business Management)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment**	Grand Total
			Th.	Pract	Th.	Pract		
1.	MGT-421	Retailing and Supply Chain Management	4	0	80		20	100
2.	AGE-422	Macro Economic Analysis	4	0	80		20	100
3.	AGE-423	Economic problems of Agriculture in India	4	6	80	40	30	150
4.	EXT-424	Visual and Graphic Communication	4	6	80	40	30	150
5.	TPR	Training Project Report	--	--	--	--	--	150
		Total	**16**	**12**	**32**	**80**	**100**	**650**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

B.Sc. Agriculture (Hons.)

SEMESTER -VIII

ELECTIVE -CROP PROTECTION
(Entomology, Plant Pathology & Nematology)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment**	Grand Total
			Th.	Pract	Th	Pract		
1.	PPL-421	Biocontrol and Integrated Disease Management	4	6	80	40	30	150
2.	ENT-422	Biocontrol and Integrated Pest management	4	6	80	40	30	150
3.	ENT-423	Pesticides and Plant Protection Equipment	4	6	80	40	30	150
4	PPL-424	Plant Disease Diagnosis	0	6	-	40	10	50
5.	TPR	Training Project Report						150
		Total	**12**	**24**	**240**	**160**	**100**	**650**

**Internal Assessment = (60% of MST + 15 % of Attendane + 25% of Academic Activity).

B.Sc. Agriculture (Hons.)

FSC-111: Fundamentals of Horticulture

Time: 3 Hours **Max. Marks: 50**

Theory: 25

Practical: 12

Internal Assessment 13

Periods per week 3+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 5 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (5).

Theory

Section-A: Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification; principles of orchard establishment; climate and soil for horticultural crops;

Section-B: Plant propagation-methods and propagating structures; Seed dormancy, Seed germination,

Section-C: Principles and methods of training and pruning, juvenility and flower bud differentiation; unfruitfulness; pollination, pollinizers and pollinators; fertilization and parthenocarpy; medicinal and aromatic plants;

Section-D: 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.

B.Sc. Agriculture (Hons.)

PBG-112 **Fundamentals of Genetics**

Time: 3 Hours **Max. Marks: 75**
Theory: 37
Practical: 19
Internal Assessment 19
Periods per week 4+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 9 short answer type questions) covering the whole syllabus will be compulsory. This will comprise of 9 marks.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (7).

Theory

Section-A: Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity. Architecture of chromosome; chromonemata, chromomeres, centromere, secondary constriction and telomere; special types of chromosomes. Chromosomal theory of inheritance. Cell cycle and cell division- mitosis and meiosis.Probability and Chi-square. Dominance relationships, Epistatic interactions with example

Section-B: Multiple alleles, pleiotropism and pseudoalleles. Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanisms, chromosome mapping.

Section-C: Structural and numerical variations in chromosomes and their implications, Mutation, classification, methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation. Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance. Genetic disorders.

Section-D: Nature, structure & replication of genetic material. Protein synthesis, transcription and translational mechanism of genetic material, Gene concept: Gene structure, function and regulation, Lac and Trp operons.

Practical

Study of microscope. Study of cell structure. Mitosis and Meiosis cell division. Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross, Experiments on epistatic interactions including test cross and back cross, Experiments on probability and Chi-square test. Determination of linkage and cross-over analysis (through two point test cross and three point test cross data). Study on sex linked inheritance in Drosophila. Study of models on DNA and RNA structures.

B.Sc. Agriculture (Hons.)

SSC-113: Fundamentals of Soil Science

Time: 3 Hours **Max. Marks: 75**

Theory: 37

Practical: 19

Internal Assessment 19

Periods per week 4+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 9 short answer type questions) covering the whole syllabus will be compulsory. This will comprise of 9 marks.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (7).

Theory:

Section-A: 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;

Section-B: Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity; soils of India; Soil water retention, movement and availability;

Section-C: 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;

Section-D: Soil colloids - inorganic and organic; silicate clays: constitution and properties; soil organic matter: composition, properties and its influence on soil properties; soil organisms: macro and micro organisms, their beneficial and harmful effects;.

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 pH and electrical conductivity.Study of soil map.Determination of soil colour.Estimation of organic matter content of soil.

B.Sc. Agriculture (Hons.)

FOR-114: Introduction to Forestry

Time: 3 Hours **Max. Marks: 50**

Theory: 25

Practical: 12

Internal Assessment 13

Periods per week 3+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 5 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (5).

Theory:

Section-A: 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;

Section-B: 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;

Section-C: 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.

Section-D: 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, diametermeasurements of forked, buttressed, fluted and leaning trees. Height measurement of standingtrees 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. Visits of nearby forest based industries.

B.Sc. Agriculture (Hons.)

AGR-115: Fundamentals of Agronomy

Time: 3 Hours **Max. Marks: 100**

Theory: 50

Practical: 25

Internal Assessment 25

Periods per Week 6+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 10 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (10).

Theory:

Section-A: Agronomy and its scope, seeds and sowing, tillage and tilth, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency,

Section-B: Water resources, soil plant water relationship, crop water requirement, water use efficiency, irrigation- scheduling criteria and methods, quality of irrigation water, water logging.

Section-C: Weeds- importance, classification, crop weed competition, concepts of weed management-principles and methods, herbicides- classification, selectivity and resistance, allelopathy.

Section-D: Growth and development of crops, factors affecting growth and development, plant ideotypes, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

Practical:

Identification of crops, seeds, fertilizers, pesticides and tillage implements, Effect of sowing depth on germination and seedling vigour, Identification of weeds in crops, Methods of herbicide and fertilizer application, Study of yield contributing characters and yield estimation, Seed germination and viability test, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Use of tillage implements-reversible plough, one way plough, harrow, leveler, seed drill, Study of soil moisture measuring devices, Measurement of field capacity, bulk density and infiltration rate, Measurement of irrigation water.

B.Sc. Agriculture (Hons.)

EXT-116: Rural Sociology & Educational Psychology

Time: 3 Hours **Max. Marks: 50**

Theory: 37

Internal Assessment= 13

Periods per week 4+0

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 9 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (7).

Theory:

Section-A: Sociology and Rural sociology: Definition and scope, its significance in agriculture extension.

Section-B: Rural society, Social Groups, Social Stratification, Culture concept, Social Institution, Social Change & Development.

Section-C: Educational psychology: Meaning & its importance in agriculture extension. Behavior: Cognitive, affective, psychomotor domain.

Section-D: Personality, Learning, Motivation, Theories of Motivation, Intelligence

B.Sc. Agriculture (Hons.)

BOT-117: **Introductory Biology**

Time: 3 Hours **Max. Marks: 50**
Theory: 25
Practical: 12
Internal Assessment 13
Periods per week 3+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 5 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (5).

Theory:

Section-A: Introduction to the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics.

Section-B: Binomial nomenclature and classification Cell and cell division.

Section-C: Morphology of flowering plants. Seed and seed germination.

Section-D: Plant systematics- viz; Brassicaceae, Fabaceae and Poaceae. Role of animals in agriculture.

Practical

Morphology of flowering plants – root, stem and leaf and their modifications. Inflorescence, flower and fruits. Cell, tissues & cell division. Internal structure of root, stem and leaf. Study of specimens and slides. Description of plants - Brassicaceae, Fabaceae and Poaceae.

B.Sc. Agriculture (Hons.)

MAT-117 **Elementary Mathematics**

Time: 3 Hours **Max. Marks: 50**

Theory: 37

Internal Assessment =13

Periods per week 4+0

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 9 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (7).

Theory:

1. **Straight lines :** Distance formula, section formula (internal and external division), Equation of co-ordinate axes, Equation of lines parallel to axes, Slope-intercept form of equation of line, Slope-point form of equation of line, Two point form of equation of line,
2. Intercept form of equation of line, Normal form of equation of line, General form of equation of line, Point of intersection of two straight lines, Angles between two straight lines, Parallel lines, Perpendicular lines.
3. **Circle:** Equation of circle whose centre and radius is known, General equation of a circle, Equation of circle passing through three given points, Equation of circle whose diameters is line joining two points (x_1, y_1) & (x_2,y_2).
4. Definition of function, limit and continuity(of algebraic functions)
5. **Differential Calculus:** Differentiation of algebraic functions, exponential functions and logarithmic differentiation (excluding trigonometric functions). Derivative of sum, difference, product and quotient of two functions.
6. ***Integral Calculus : Integration of Product of two functions, Integration by substitution method, Definite Integrals (of algebraic functions).***
7. **Matrix:** Definition of Matrices, Addition, Subtraction, Multiplication, Transpose of matrix up to 3^{rd} order.
8. **Determinants:** Properties of determinants and their evaluation, Inverse of matrix up to 3^{rd} order. Matrix method.

B.Sc. Agriculture (Hons.)

AGH-118 **Agricultural Heritage**

Time: 3 Hours **Max. Marks: 25**

Theory: 19

Internal Assessment=6

Periods per week 1+0

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 3 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (4).

Theory

Section-A: Introduction of Indian agricultural heritage; Ancient agricultural practices, Relevance of heritage to present day agriculture;

Section-B: 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;

Section-C: Crop voyage in India and world; Agriculture scope; Importance of agriculture and agricultural resources available in India; Crop significance and classifications;

Section-D: National agriculture setup in India; Current scenario of Indianagriculture; Indian agricultural concerns and future prospects.

B.Sc. Agriculture (Hons.)

ENG-119 Communication Skills in English

Time: 3 Hours

Max. Marks: 50
Theory: 37
Internal Assessment:13
Periods per week: 4+0

1. Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings; Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.

Activities:

a) Active reading of passages on general topics,
b) Reading newspaper. Articles, Editorials etc.
c) Short questions based on content and development of ideas of a given paragraph.

2. Writing Skills: Guidelines for effective writing; writing styles for application, resume, personal letter, official/ business letter, memo, notices etc.

Activities:

a) Personal and business letters.
b) Converting a biographical note into a sequenced resume.
c) Writing notices for circulation/ boards.
d) Making notes of given passage with headings and sub-headings.
e) Writing newspaper reports based on given heading.

Suggested Pattern of Question Paper:

The question paper will consist of Seven skill-oriented questions from Reading and Writing Skills. The first 6 Questions carry 5 marks each. The 7th Question carries 7 marks. The questions shall be phrased in a manner that students know clearly what is expected of them. There will be internal choice wherever possible.

i. Comprehension questions of an unseen passage.
ii. Personal letter Official/Business Letters.
iii. Writing notices/agenda/resolution/ minutes for public circulation on topics of professional interest
iv. Writing resume of converting a biographical note into resume
v. Writing news report based on a given heading
vi. Do as directed Articles Units 69-81
Conjuction Unit 113-120 (6x5=30Marks)

vii. Translation from English to Vernacular (Punjabi/Hindi) (Isolated Sentences)
(1x7=7 Marks)

Recommended Books:

1. Oxford Guide to Effective Writing and Speaking by John Seely.
2. The Written Word by Vandana R Singh, Oxford University Press.
3. Murphy's English Grammer (by Raymond Murphy) CUP.

B.Sc. Agriculture (Hons.)

GPB-120 **Punjabi (Compulsory)**

Time: 3 Hours **Max. Marks: 50**

Theory: 37

Internal Assessment 13

Periods per Week 4+0

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਸਾਹਿਤ ਦੇ ਰੰਗ** (ਸੰਪਾ. ਡਾ. ਮਹਿਲ ਸਿੰਘ), ਭਾਗ ਪਹਿਲਾ (ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
2. **ਪੰਜਾਬ ਦੇ ਮਹਾਨ ਕਲਾਕਾਰ** (ਬਲਵੰਤ ਗਾਰਗੀ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
   ਲੇਖ : ਕੇ. ਐਲ.ਸਹਿਗਲ, ਬੜੇ ਗ਼ੁਲਾਮ ਅਲੀ ਖਾਂ, ਸੋਭਾ ਸਿੰਘ, ਪ੍ਰਿਥਵੀਰਾਜ ਕਪੂਰ, ਭਾਈ ਸਮੁੰਦ ਸਿੰਘ।
3. **ਪੈਰ੍ਹਾ ਰਚਨਾ**
4. **ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ**।
5. (ੳ) **ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ :** ਉਚਾਰਨ ਅੰਗ, ਉਚਾਰਨ ਸਥਾਨ ਤੇ ਵਿਧੀਆਂ, ਸਵਰ, ਵਿਅੰਜਨ, ਸੁਰ।
   (ਅ) **ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ** : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ।
6. **ਮਾਤ ਭਾਸ਼ਾ ਦਾ ਅਧਿਆਪਨ**
   (ੳ) ਪਹਿਲੀ ਭਾਸ਼ਾ ਦੇ ਤੌਰ ਉੱਤੇ
   (ਅ) ਦੂਜੀ ਭਾਸ਼ਾ ਦੇ ਤੌਰ ਉੱਤੇ

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਕਿਸੇ ਕਵਿਤਾ ਦਾ ਸਾਰ ਜਾਂ ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ (ਦੋ ਵਿਚੋਂ ਇਕ) **7 ਅੰਕ**
2. ਕਿਸੇ ਕਹਾਣੀ ਦਾ ਸਾਰ, ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ, ਕਹਾਣੀ ਕਲਾ ਜਾਂ ਪਾਤਰ ਉਸਾਰੀ (ਦੋ ਵਿਚੋਂ ਇਕ) **7 ਅੰਕ**
3. ਪੈਰ੍ਹਾ ਰਚਨਾ : ਤਿੰਨ ਵਿਸ਼ਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਇਕ ਉਤੇ ਪੈਰ੍ਹਾ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇ । **4 ਅੰਕ**
4. ਪੈਰ੍ਹਾ ਦੇ ਕੇ ਉਸ ਬਾਰੇ ਪੰਜ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ **4 ਅੰਕ**
5. ਨੰਬਰ 5 ਉਤੇ ਦਿੱਤੀ ਵਿਆਕਰਣ ਦੇ ਆਧਾਰ ...ਤੇ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ **7 ਅੰਕ**
6. ਨੰਬਰ 6 ਵਿਚ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਪਹਿਲੀ ਭਾਸ਼ਾ ਅਤੇ ਦੂਜੀ ਭਾਸ਼ਾ ਵਜੋਂ ਅਧਿਆਪਨ, ਮਹੱਤਵ ਅਤੇ ਸਮੱਸਿਆਵਾਂ ਬਾਰੇ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋ ਵਿਦਿਆਰਥੀ ਨੇ ਦੋ ਦਾ ਉੱਤਰ ਦੇਣਾ ਹੋਵੇਗਾ।

(4×2)=8 ਅੰਕ

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜ਼ੋ ਕਾਲਜ ਵਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾ ਅਨੁਸਾਰ ਇਨ੍ਹਾਂ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13=50 ਹਨ।

B.Sc. Agriculture (Hons.)

BPB-120 **Basic Punjabi**

Time: 3 Hours **Max. Marks: 50**

Theory: 37

Internal Assessment 13

Periods per Week 4+0

1. **ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ**
   ੳ) ਨਾਮਕਰਣ ਤੇ ਸੰਖੇਪ ਜਾਣ ਪਛਾਣ : ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ੳ ਅ ੲ), ਲਗਾਂ ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ।
   ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ **12 ਅੰਕ**

2. **ਗੁਰਮੁਖੀ, ਆਰਥੋਗ੍ਰਾਫੀ ਅਤੇ ਉਚਾਰਨ** : ਸਵਰ, ਵਿਅੰਜਨ : ਮੁੱਢਲੀ ਜਾਣ-ਪਛਾਣ ਅਤੇ ਉਚਾਰਣ, ਮੁਹਾਰਨੀ, ਲਗਾਂ ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ । **10 ਅੰਕ**

3. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਜੋੜ** : ਮੁਕਤਾ (ਦੋ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਲਗਾਂਖਰ (ਟਿੱਪੀ, ਬਿੰਦੀ, ਅੱਧਕ) ਵਾਲੇ ਸ਼ਬਦ, ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ।
   15 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅੰਕ ਹਨ। **(4+4+4) 12 ਅੰਕ**
2. ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਨੰਬਰ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। **10 ਅੰਕ**
3. ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿਨ੍ਹਾਂ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। **15 ਅੰਕ**

B.Sc. Agriculture (Hons.)

HVE-1111* **Human Values and Ethics**

Time: 3 Hours **Max. Marks: 25 (NC)**

Theory: 19

Internal Assessment=6

Periods per week 2+0

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (Comprising of 9 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (7).

Theory

Section-A: Universal human aspirations: Happiness and prosperity; Human values and ethics: Concept, definition, significance and sources; Fundamental values: Right conduct, peace, truth, love and non-violence;

Section-B: Ethics: professional, environmental, ICT; Sensitization towards others particularly senior citizens, developmentally challenged and gender.

Section-C: Spirituality, positive attitude and scientific temper; Team work and volunteering; Rights and responsibilities; Road safety; Human relations and family harmony;

Section-D: Modern challenges and value conflict: Sensitization against drug abuse and other social evils; Developing personal code of conduct (SWOT Analysis); Management of anger and stress.

B.Sc. Agriculture (Hons.)

SOA-101* **Drug Abuse: Problem, Management and Prevention**

Time: 3 Hours **Max. Marks: 50 (NC)**

Theory: 37

Internal Assessment=13

Periods per week 2+0

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (Comprising of 9 short answer type questions) covering the whole syllabus will be compulsory.
4. Of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All questions will carry equal marks (7).

B.Sc. Agriculture (Hons.)

BCT-121: Fundamentals of Plant Biochemistry and Biotechnology

Time: 3 Hours **Max. Marks: 75**

Theory: 37

Practical: 19

Internal Assessment 19

Periods per week 4+3

Instructions for the Paper Setters:

5. Question paper should be set strictly according to the syllabus.
6. The language of questions should be straight & simple.
7. There will be total of nine questions, out of which first question (comprising of 9 short answer type questions) covering the whole syllabus will be compulsory.
8. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (7).

Theory

Section-A: Importance of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate: Importance and classification. Structures of Monosaccharides, Structure of Disaccharides and Polysaccharides. Lipid: Importance and classification. Proteins: Importance of proteins and classification; Structures, zwitterions, nature of amino acids; Structural organization of proteins. Enzymes: General properties; Classification; Mechanism of action.

Section-B: Nucleic acids: Importance and classification; Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure. Metabolism of carbohydrates: Glycolysis, TCA cycle, Electron transport chain. Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids.

Section-C: Concepts and applications of plant biotechnology: embryo culture, anther culture, pollen culture and ovule culture and their applications; Micro-propagation methods; organogenesis and embryogenesis, Synthetic seeds and their significance; somatic hybridization and cybrids;;

Section-D: Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and *Agrobacterium* mediated gene transfer methods; PCR techniques and its applications;

Practical

Preparation of solution, pH & buffers, Qualitative tests of carbohydrates, amino acids and proteins. Paper chromatography, Sterilization techniques. Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium. Callus induction from various explants, micropropagation.

B.Sc. Agriculture (Hons.)

MBL-122: Agricultural Microbiology

Time: 3 Hours **Max. Marks: 50**

Theory: 25

Practical: 12

Internal Assessment 13

Periods per week 3+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 5 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (5).

Theory:

Section-A: Introduction. Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, chemoautotrophy, photoautotrophy, growth. Genetic recombination-transformation, conjugation and transduction, plasmids, transposons.

Section-B: Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and sulphur cycles.

Section-C: Biological nitrogen fixation- symbiotic, associative and aysmbiotic. *Azolla*, blue green algae and mycorrhiza. Rhizosphere and phyllosphere.

Section-D: Microbes in human welfare: silage production, biofertilizers, biopesticides, biofuel production and biodegradation.

Practical

Introduction to microbiology laboratory and its equipments; Microscope- parts, principles of microscopy, resolving power and numerical aperture. Methods of sterilization. Nutritional media and their preparations. Enumeration of microbial population in soil- bacteria, fungi, actinomycetes. Methods of isolation and purification of microbial cultures. Isolation of *Rhizobium* from legume root nodule. Isolation of *Azotobacter* from soil. Isolation of *Azospirillum* from roots. Staining and microscopic examination of microbes.

B.Sc. Agriculture (Hons.)

SWE-123 Introductory Soil and Water Conservation Engineering

Time: 3 Hours **Max. Marks: 50**
Theory: 25
Practical: 12
Internal Assessment 13
Periods per week 3+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 5 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (5).

Theory:

Section-A:

1) Soil Erosion Principles.
2) Erosivity and Erodibility
3) Factors affecting water erosion
4) Types of water erosion (Raindrop, sheet, rill and gully erosion)

Section-B:

5) Gully classification
6) Gully control measures

Section-C:

7) Factors affecting wind erosion
8) Wind erosion control measures (wind breaks and shelter belts)

Section-D:

9) Universal Soil loss Equation for water erosion
10) Conservation measure for hill slopes
11) Conservation measures for agricultural lands

Practical:

1) General Status of Soil Conservation in India
2) Calculation of erosion index
3) Estimation of soil loss
4) Design of contour bunds
5) Design of graded bunds
6) Design of bench terracing system
7) Problems on wind erosion

B.Sc. Agriculture (Hons.)

BOT-124 **Fundamentals of Crop Physiology**

Time: 3 Hours **Max. Marks: 50**

Theory: 25

Practical: 12

Internal Assessment 13

Periods per week 3+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 5 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (5).

Theory

Section-A: Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview; Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology;

Section-B: Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms;

Section-A: Photosynthesis: Light and Dark reactions, C3, C4 and CAM plants; Respiration: Glycolysis, TCA cycle and electron transport chain;

Section-D: Plant growth regulators: Physiological roles and agricultural uses, Physiological aspects of growth and development of major crops: Growth analysis, Role of Physiological growth parameters in crop productivity.

Practical

Study of plant cells, structure and distribution of stomata, imbibitions, osmosis, plasmolysis, measurement of root pressure, rate of transpiration, Separation of photosynthetic pigments through paper chromatography, photosynthesis, respiration, tissue test for mineral nutrients, estimation of relative water content.

B.Sc. Agriculture (Hons.)

AGE-125: Fundamentals of Agricultural Economics

Time: 3 Hours **Max. Marks: 50**

Theory: 37

Internal Assessment 13

Periods per week 4+0

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 9 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (7).

Theory:

Section-A: Basic concepts: Goods and services, desire, want, demand, utility, cost and price,wealth, capital, income and welfare. Agricultural economics: meaning, importance role of Agriculture in economic development. Agricultural planning and development in the country. Population: Malthusian theory, Elements of economic planning.

Section-B: *Demand:* meaning, law of demand, schedule and demand curve,determinants, utility theory; law of diminishing marginal utility, equi-marginal utility principle. Consumer's equilibrium and derivation of demand curve, concept of consumer surplus. Elasticityof demand: concept and measurement of price elasticity, income elasticity and cross elasticity.

Section-C: Production: input output relationship. *Laws of returns*: Law of variable proportions and law of returns to scale. *Cost:* concepts, short run andlong run cost curves. Supply: Stock v/s supply, law of supply, schedule, supply curve, determinants of supply, elasticity of supply. Market structure: meaning and types of market, basic features of perfectly competitive and imperfect markets. Price determination under perfect competition;short run and long run equilibrium of firm and industry,

Section-D: *National income:* Meaning concepts of national income approaches to measurement, difficulties in measurement. Money: Barter system of exchange and its problems, meaning and functions of money, classification of money, Agricultural and public finance: micro v/s macro finance, need for agricultural finance, public revenue and public expenditure. *Tax:* meaning, direct and indirect taxes, agricultural taxation, socialistic and mixed economies,

B.Sc. Agriculture (Hons.)

PPL-126: Fundamentals of Plant Pathology

Time: 3 Hours **Max. Marks: 100**
Theory: 50
Practical: 25
Internal Assessment: 25
Periods per week 6+3

Instructions for the Paper Setters:

5. Question paper should be set strictly according to the syllabus.
6. The language of questions should be straight & simple.
7. There will be total of nine questions, out of which first question (comprising of 10 short answer type questions) covering the whole syllabus will be compulsory.
8. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (10).

Theory

Section-A: Introduction: Importance of plant diseases, scope and objectives of Plant Pathology. History of Plant Pathology with special reference to Indian work. Terms and concepts in Plant Pathology and Pathogenesis. Causes / factors affecting disease development: disease triangle and tetrahedron and classification of plant diseases. Important plant pathogenic organisms, different groups: fungi, bacteria, fastidious vascular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them. Diseases and symptoms due to abiotic causes.

Section-B: 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. Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction. Viruses: nature, structure, replication and transmission. Study of phanerogamic plant parasites.

Section-C: Growth and reproduction of plant pathogens. Liberation/dispersal and survival of plant pathogens. Types of parasitism and variability in plant pathogens. Pathogenesis. Role of enzymes, toxins and growth regulators in disease development. Defense mechanism in plants.

Section-D: Epidemiology: Factors affecting disease development. Principles and methods of plant disease management. Nature, chemical combination, classification, mode of action and formulations of fungicides and antibiotics.

Practical:

Acquaintance with various laboratory equipments and microscopy. Collection and preservation of disease specimen. 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. 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.

B.Sc. Agriculture (Hons.)

ENT-127 **Fundamentals of Entomology**

Time: 3 Hours **Max. Marks: 100**

Theory: 50

Practical: 25

Internal Assessment: 25

Periods per week: 6+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 10 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (10).

Theory

Section-A: History of Entomology in India. Classification of phylum Arthropoda upto classes. Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta upto Orders, Special emphasis to orders and families of Agricultural importance like **Orthoptera**: Acrididae, Tettigonidae, Gryllidae; **Dictyoptera**: Mantidae, Blattidae; **Odonata**; **Isoptera**: Termitidae; **Thysanoptera**: Thripidae; **Hemiptera**: Pentatomidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae; **Neuroptera**: Chrysopidae; **Lepidoptera**: Pieridae, Noctuidae, Pyralidae, Gelechiidae, Arctiidae, Bombycidae; **Coleoptera**: Coccinellidae, Chrysomelidae, Curculionidae, Bruchidae; **Hymenoptera**: Tenthridinidae, Apidae. Trichogrammatidae, lchneumonidae, Braconidae; **Diptera**: Cecidomyiidae, Culicidae,Muscidae, Tephritidae.

Section-B: Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure and modifications of insect antennae, mouth parts, legs, Wing modifications and wing coupling apparatus. Structure of male and female genital organ. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous and reproductive system in insects. Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptor.

Section-C: Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors– temperature, moisture, humidity, rainfall, light. Effect of biotic factors – food competition, natural and environmental resistance. Major points related to dominance of class Insecta in Animal kingdom. Various categories of pests.

Section-D: Concept of IPM, Practices, scope and limitations of IPM. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Chemical control- importance, hazards and limitations. Recent methods of pest control, repellents, antifeedants, hormones, attractants, gamma radiation. Insecticides Act 1968- Important provisions. Symptoms of poisoning, first aid and antidotes.

Practical:

Methods of collection and preservation of insects including immature stages;

External features of Grasshopper

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

B.Sc. Agriculture (Hons.)

EXT-128 Fundamentals of Agricultural Extension Education

Time: 3 Hours **Max. Marks: 75**

Theory: 37

Practical: 19

Internal Assessment 19

Periods per week 4+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 9 short answer type questions) covering the whole syllabus will be compulsory. This will comprise of 9 marks.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (7).

Theory:

Section-A: Education: Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education; Extension Programme planning- Meaning, Process, Principles and Steps in Programme Development. Extension systems in India:

Section-B: Extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era (Etawah Pilot Project, Nilokheri Experiment, etc.); various extension/ agriculture development programmes launched by ICAR/Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND, NATP, NAIP etc.), New trends in agriculture extension, cyber extension/e-extension, expert system etc. Rural Development: concept, meaning, definition; Community Dev.-meaning, definition, concept & principles.

Section-C: Philosophy of C.D. Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: extension teaching methods: meaning, classification, individual, group and mass contact methods.

Section-D: Principles and Functions of Communication, models and barriers to communication. Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories.

Practical:

To get acquainted with university extension system. Group discussion- exercise; handling and use of audio visual equipments and digital camera and LCD projector; preparation and use of AV aids, preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories; Presentation skills exercise; micro teaching exercise; Role of community radio and television studio for understanding the process of programme production; script writing, writing for print and electronic media, developing script for radio and television.

B.Sc. Agriculture (Hons.)

ENG-129 Communication Skills in English

Time: 3 Hours **Max. Marks: 50**
Theory: 37
Internal Assessment:13
Periods per week :4+0

1. Listening Skills: Barriers to listening; effective listening skills; feedback skills. Attending telephone calls; note taking.

Activities:

a) Listening exercises – Listening to conversation, speech/lecture and taking notes.

2. Speaking and Conversational Skills: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics. Situation based Conversation in English. Essentials of Spoken English.

Activities:

a) Conversation; dialogue and speech.
b) Oral description or explanation of a common object, situation or concept.
c) Interviews and group discussion.

Suggested Pattern of Question Paper:

The question paper will consist of Seven skill-oriented questions from Listening and Speaking Skills. The first 6 questions carry 5 marks each. The 7th question carries 7 marks. The questions shall be phrased in a manner that students know clearly what is expected of them. There will be internal choice wherever possible.

viii. Making summary/precise or paraphrasing of an idea of a given passage.
ix. Writing a paragraph of expository or argumentative nature of a given topic.
x. Interpretation of a given data, charts, diagrams etc and making a brief report.
xi. Transcoding (given dialogue to a prose or given prose to dialogue)
xii. Draft and Advertisement for a given Product.
xiii. Do as directed change of voice units 42-46 (6x5=30 Marks)
xiv. Retranslation from Vernacular (Punjabi/Hindi) to English (Isolated Sentences) (1x7=7 Marks)

Recommended Books:

4. Oxford Guide to Effective Writing and Speaking by John Seely.
5. The Written Word by Vandana R Singh, Oxford University Press.
Murphy's English Grammer (by Raymond Murphy) CUP.

B.Sc. Agriculture (Hons.)

GPB-130 **Punjabi (Compulsory)**

Time: 3 Hours **Max. Marks: 50**
Theory: 37
Internal Assessment:13
Periods per Week 4+0

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

3. **ਸਾਹਿਤ ਦੇ ਰੰਗ** (ਸੰਪਾ. ਡਾ. ਮਹਿਲ ਸਿੰਘ), ਭਾਗ ਦੂਜਾ (ਵਾਰਤਕ ਅਤੇ ਰੇਖਾ-ਚਿੱਤਰ), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
4. **ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ** : ਪਰਿਭਾਸ਼ਾ, ਮੁਢਲੇ ਸੰਕਲਪ।
5. **ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ**
6. **ਪੈਰ੍ਹਾ ਰਚਨਾ**
7. **ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ**
8. **ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ**

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਕਿਸੇ ਲੇਖ/ਨਿਬੰਧ ਦਾ ਸਾਰ ਜਾਂ ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ (ਦੋ ਵਿਚੋਂ ਇਕ) **(7 ਅੰਕ)**
2. ਰੇਖਾ ਚਿਤਰ : ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਸ਼ਖ਼ਸੀਅਤ ਦੇ ਗੁਣ **(7 ਅੰਕ)**
3. ਯੂਨਿਟ 3-4 ਨੰਬਰ ਉੱਤੇ ਦਿੱਤੀ ਵਿਆਕਰਣ ਦੇ ਆਧਾਰ ਤੇ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ **(7 ਅੰਕ)**
5. ਪੈਰ੍ਹਾ ਰਚਨਾ : ਤਿੰਨ ਵਿਸ਼ਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਇਕ ਉਤੇ ਪੈਰ੍ਹਾ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇ । **(4 ਅੰਕ)**
6. ਪੈਰ੍ਹਾ ਦੇ ਕੇ ਉਸ ਬਾਰੇ ਚਾਰ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ **(4 ਅੰਕ)**
7. ਨੰਬਰ 7 ਵਿਚ ਅੱਠ ਅਖਾਣ ਅਤੇ ਅੱਠ ਮੁਹਾਵਰੇ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਚਾਰ-ਚਾਰ ਨੂੰ ਵਾਕਾਂ ਵਿਚ ਵਰਤ ਕੇ ਅਰਥ ਸਪੱਸ਼ਟ ਕਰਨੇ ਹੋਣਗੇ। **(4+4 = 8 ਅੰਕ)**

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜ਼ੋ ਕਾਲਜ ਵਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾ ਅਨੁਸਾਰ ਇਨ੍ਹਾਂ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13=50 ਹਨ।

B.Sc. Agriculture (Hons.)

BPB-130 **Basic Punjabi**

Time: 3 Hours **Max. Marks: 50**
Theory: 37
Internal Assessment:13
Periods per Week 4+0

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ** : ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਣਿਕ ਸ਼ਬਦ **12 ਅੰਕ**

2. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਪ੍ਰਕਾਰ** :
   ੳ) ਸੰਯੁਕਤ ਸ਼ਬਦ, ਸਮਾਸੀ ਸ਼ਬਦ, ਦੋਜਾਤੀ ਸ਼ਬਦ, ਦੋਹਰੇ/ਦੁਹਰੁਕਤੀ ਸ਼ਬਦ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ
   ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ **10 ਅੰਕ**

3. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ** :

ੳ) ਇਕ-ਵਚਨ ਬਹੁ-ਵਚਨ, ਲਿੰਗ-ਪੁਲਿੰਗ, ਬਹੁਆਰਥਕ ਸ਼ਬਦ, ਸਮਾਨਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਲਈ ਇਕ ਸ਼ਬਦ, ਸ਼ਬਦ ਜੁੱਟ, ਵਿਰੋਧਆਰਥਕ ਸ਼ਬਦ, ਸਮਨਾਮੀ ਸ਼ਬਦ

ਅ) ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ : ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਮਾਰਕੀਟ/ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ। **10+5=15 ਅੰਕ**

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਭਾਗ ਪਹਿਲਾਂ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹਨ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਪੰਜ-ਪੰਜ ਨੰਬਰ ਹਨ । 12 ਅੰਕ

2. ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਨੰਬਰ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। 10 ਅੰਕ

3. ਭਾਗ ਤੀਸਰਾ ਦੇ (ੳ) ਭਾਗ ਵਿਚੋਂ ਦੋ ਸਵਾਲ ਅਤੇ (ਅ) ਭਾਗ ਵਿਚੋਂ ਇਕ ਸਵਾਲ ਪੁਛਿਆ ਜਾਵੇਗਾ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। 10+5=15 ਅੰਕ

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਇਨ੍ਹਾਂ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

B.Sc. Agriculture (Hons.)

SOA-101* **Drug Abuse: Problem, Management and Prevention**

Time: 3 Hours **Max. Marks: 50**
Theory: 37
Internal Assessment:13
Periods per week 2+0

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of nine questions, out of which first question (comprising of 9 short answer type questions) covering the whole syllabus will be compulsory.
4. Of the remaining 8 questions, two questions will be asked from each section (A,B,C,D) and the candidate will attempt 4 questions (one from each section). All questions will carry equal marks (7).

B.Sc. Agriculture (Hons.)

AGR-211: Crop Production Technology-I (Kharif Crops)

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *Kharif* crops. Cereals – rice, maize, sorghum, pearl millet and finger millet, pulses-pigeonpea, mungbean and urdbean; oilseeds- groundnut, and soybean; fibre crops- cotton & Jute; forage crops-sorghum, cowpea, cluster bean and napier.

Practical:

Rice nursery preparation, transplanting of Rice, sowing of soybean, pigeonpea and mungbean. maize, groundnut and cotton, effect of seed size on germination and seedling vigour of kharif season crops, effect of sowing depth on germination of kharif crops, identification of weeds in kharif season crops, top dressing and foliar feeding of nutrients, study of yield contributing characters and yield calculation of kharif season crops, study of crop varieties and important agronomic experiments at experimental farm. study of forage experiments, morphological description of kharif season crops, visit to research centres of related crops.

B.Sc. Agriculture (Hons.)

PBG- 212: Fundamentals of Plant Breeding

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Historical development, concept, nature and role of plant breeding, major achievements and future prospects; Genetics in relation to plant breeding, modes of reproduction and apomixis, self – incompatibility and male sterility- genetic consequences, cultivar options. Domestication, Acclimatization, introduction; Centres of origin/diversity, components of Genetic variation; Heritability and genetic advance; Genetic basis and breeding methods in self- pollinated crops-mass and pure line selection, hybridization techniques and handling of segregating population; Multiline concept. Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops, modes of selection; Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops, clonal selection and hybridization; Wide hybridization and pre-breeding; Polyploidy in relation to plant breeding, mutation breeding-methods and uses; Biotechnological tools-DNA markers and marker assisted selection. Participatory plant breeding; Intellectual Property Rights, Patenting, Plant Breeders and Farmer's Rights.

Practical

Plant Breeder's kit, Study of germplasm of various crops. Study of floral structure of self-pollinated and cross pollinated crops. Emasculation and hybridization techniques in self & cross pollinated crops. Consequences of inbreeding on genetic structure of resulting populations. Study of male sterility system. Handing of segregation populations. Methods of calculating mean, range, variance, standard deviation, heritability. Designs used in plant breeding experiment, analysis of Randomized Block Design. To work out the mode of pollination in a given crop and extent of natural out crossing. Prediction of performance of double cross hybrids

B.Sc. Agriculture (Hons.)

AGE-213: Agricultural Finance and Co-Operation

Time: 3 Hours

Max. Marks: 75
Theory: 40
Practical: 20
Internal assessment 15
Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Agricultural Finance- meaning, scope and significance, credit needs and its role in Indian agriculture. Agricultural credit: meaning, definition, need, classification. Credit analysis: 4 R's, and 3C's of credits. Sources of agricultural finance: institutional and non-institutional sources, commercial banks, social control and nationalization of commercial banks, Micro financing including KCC. Lead bank scheme, RRBs, Scale of finance and unit cost. An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, world bank. Preparation and analysis of financial statements – Balance Sheet and Income Statement.Basic guidelines for preparation of project reports.

Agricultural Cooperation – Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture.

Practical

Analysis of progress and performance of cooperatives using published data. Analysis of progress and performance of commercial banks and RRBs using published data. Estimation of credit requirement of farm business – A case study.Preparation and analysis of balance sheet – A case study.Preparation and analysis of income statement – A case study.Appraisal of a loan proposal – A case study.

B.Sc. Agriculture (Hons.)

AGI-214 **Agricultural Informatics**

Time: 3 Hours **Max. Marks: 75**

Theory= 40

Practical = 20

Internal Assessment 15

Periods per week 3+3

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Introduction to Computers, Operating Systems, definition and types, Applications of MS-Office for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations.

e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models for understanding plant processes.. Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions. Preparation of contingent crop-planning using IT tools.

Practical

Study of Computer Components, accessories, practice of important DOS Commands. Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document. MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data. MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system. Introduction to World Wide Web (WWW). Introduction of programming languages. Hands on Crop Simulation Models (CSM) such as DSSAT/Crop-Info/CropSyst/ Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools. Hands on Decision Support System. Preparation of contingent crop planning.

B.Sc. Agriculture (Hons.)

AEN-215 **Farm Machinery and Power**

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:-

1. Farm power in India & Sources.
2. IC engine & terminology.
3. Working Principle of 2-stroke & 4-Stroke engine & numerical problem.
4. Different system of tractor.
5. Tractor types & Selection.
6. Primary & Secondary implements
7. Implementation for intercultural operations
8. Familiarization with sowing & planting equipments.
9. Calibration of seed drill, & paddy transplanter & Numerical problem.
10. Plant protection equipment.
11. Familiarization with Harvesting &Threshing equipment.
12. Cost of operation of tractor & Machinery.

Practical:-

1. Study of different Componentsof IC engine.
2. Various systems of Tractor:-

- ❖ Clutch
- ❖ Transmission
- ❖ Differential
- ❖ Final drive of tractor.
- ❖ Brake
- ❖ Steering,
- ❖ Hydraulic Control system.
- ❖ Operation of Power tillers.

3. Study of Mouldboard plough, measurement, Plough size, and different parts, Horizontal &Vertical Suction.
4. Study of disc plough & disc harrow.
5. Familiarization with seed cum fertilizer drill, Furrow openers, Seed metering mechanism calibration.
6. Familiarization with different types of sprayers & dusters.
7. Familiarization with Harvesting and Threshing machinery.
8. Familiarization with planter, transplanter & different Intercultural equipment.

B.Sc. Agriculture (Hons.)

VSC-216: Production Technology for Vegetable and Spices

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Importance of vegetables & spices in human nutrition and national economy, brief about origin, area, production, improved varieties and cultivation practices such as time of sowing, sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting, storage, physiological disorders, disease and pest control and seed production of important vegetable groups (solanaceous, cucurbitaceaeous, cole, root crops, bulb, tuber, leafy and salad crops) and spices.

Practical:

Identification of vegetables & spices crops and their seeds. Nursery raising. Direct seed sowing and transplanting. Study of morphological characters of different vegetables & spices. Fertilizers applications. Raising of nursery of vegetables & spices. Vegetables & spices seed extraction. Harvesting & preparation for market. Economics of vegetables and spices cultivation

B.Sc. Agriculture (Hons.)

LPM-217 Livestock and Poultry Management

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 5+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. Management of calves, growing heifers and milch animals. Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers.

Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry.

Digestion in livestock and poultry. Classification of feedstuffs. Proximate principles of feed. Nutrients and their functions. Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry. Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.

Practical

External body parts of cattle, buffalo, sheep, goat, swine and poultry. Handling and restraining of livestock. Identification methods of farm animals and poultry. Judging of cattle, buffalo and poultry. Culling of livestock and poultry. Planning and layout of housing for different types of livestock. Computation of rations for livestock. Formulation of concentrate mixtures. Hatchery operations, incubation and hatching equipments. Management of chicks, growers and layers. Debeaking, dusting and vaccination. Economics of cattle, buffalo, sheep, goat, swine and poultry production.

B.Sc. Agriculture (Hons.)

STA-218: Statistical Methods

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory :

Introduction to Statistics and its Applications in Agriculture, Graphical Representation of Data, Measures of Central Tendency & Dispersion, Definition of Correlation, Scatter Diagram. Karl Pearson's Coefficient of Correlation. Linear Regression Equations. Introduction to Test of Significance, One sample & two sample test t for Means, Chi-Square Test of Independence of Attributes in 2×2 Contingency Table. Introduction to Analysis of Variance, Analysis of One Way Classification. Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement,

Practical:

Graphical Representation of Data. Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Dispersion (Ungrouped Data). Measures of Dispersion (Grouped Data). Moments, Correlation & Regression Analysis. Application of One Sample t-test. Application of Two Sample Fisher's t-test. Chi-Square test of Goodness of Fit. Chi-Square test of Independence of Attributes for 2×2 contingency table. Analysis of Variance One Way Classification. Analysis of one way.

B.Sc. Agriculture (Hons.)

DMT-219 **Disaster Management**

Time: 3 Hours **Max. Marks: 50**
Theory: 35
Internal Assessment 15
Periods per week 3+0

Instructions for the Paper Setters:

5. Question paper should be set strictly according to the syllabus.
6. The language of questions should be straight & simple.
7. Not more than one question should be based on one topic.
8. The question paper should cover the whole syllabus and questions should be evenly distributed.
9. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Natural Disasters- Meaning and nature of natural disasters, their types and effects. cyclone, avalanches, volcanic eruptions, Heat and cold waves, Man Made Disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, Disaster Management- Effect to mitigate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community –based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

B.Sc. Agriculture (Hons.)

ESL-220 **ENVIRONMENTAL STUDIES**

Time: 3 Hours **Max. Marks: 100**

Theory: 60

Practical: 20

Internal Assessment: 20

Periods per week 6+3

Section A (18 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying six marks. Answer to any of the question should not exceed two pages.

Section B (24 Marks): It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying twelve marks. Answer to any of the question should not exceed four pages.

Section C (18 Marks): It will consist of two questions. Candidate will be required to attempt one question only. Answer to any of the question should not exceed five pages.

1. The multidisciplinary nature of environmental studies:

Definition, scope and its importance

Need for public awareness.

2. Natural resources:

Natural resources and associated problems:

(a) Forest resources :

Use of over exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people.

(b) Water resources:

Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) Mineral resources:

Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food Resources:

World food problems, change caused by agriculture and overgrazing, effects or modern agriculture, fertilizer-pesticide problem, salinity, case studies.

(e) Energy Resources:

Growing of energy needs, renewable and non-renewable energy resources, use of alternate energy sources, case studies.

(f) Land Resources:

Land as a resource, land degradation, soil erosion and desertification.

- Role of an individual in conservation of natural resources.

- Equitable use of resources for sustainable lifestyles.

3. Ecosystem:

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of following ecosystem:

a) Forest ecosystem
b) Grassland ecosystem
c) Desert ecosystem
d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

4. Social issues and Environment:

- From unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people; its problems and concerns. Case studies. Environmental ethics: Issues and possible solutions.
- Climate change, global warning, acid rain, ozone layer depletion, nuclear accidents and holocause. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environmental Protection Acts:
  - Air (Prevention and control of pollution) Act.
  - Water (Prevention and control of pollution) Act.
  - Wildlife Protection Act
  - Forest conservation Act.

- Issues involved in enforcement of environmental legislation.
- Public awareness.

5. Biodiversity and its Conservation:

- Definition: Genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of Biodiversity: Consumptive use; productive use, social, ethical, aesthetic and option values.
- Biodiversity of global, National and local levels.
- India as mega-diversity nation.
- Hot-spots of biodiversity.

- Threats to Biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of Biodiversity: In situ and Ex-situ conservation of biodiversity.

6. Environmental Pollution:

Definition, causes, effects and control measures of:

a) Air Pollution
b) Water Pollution
c) Soil Pollution
d) Marine Pollution
e) Noise Pollution
f) Thermal Pollution
g) Nuclear Hazards,
h) Electronic Waste

- Solid waste management: Causes, effects and control measures of urban and industrial wastes
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster Management: Floods, Earthquake, Cyclone and Landslides.

7. Human Population and Environment:

Population growth, variation among nations.
Population explosion-Family welfare programme.
Environment and human health.
Human rights.

8. Value Education:

- HIV/AIDS.
- Women and child welfare.
- Role of information technology in environment and human health. Case studies.
- Road Safety Rules & Regulations.
- Accident & First Aid:
- First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance.
- Visit to a local area to document environmental assets–river/forest/grassland/hill/ mountain. Visit to a local polluted site–Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds. Study of simple ecosystems–pond, river, hill slopes etc.

Practical:

Pollution case studies. Case Studies- Field work: Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain, visit to a local polluted site-Urban/Rural/Industrial/ Agricultural, study of common plants, insects, birds and study of simple ecosystems-pond, river, hill slopes, etc.

B.Sc. Agriculture (Hons.)

AGR-221 Crop Production Technology-II (Rabi crops)

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; cereals –wheat and barley, pulses-chickpea, lentil, peas, oilseeds-rapeseed, mustard and sunflower; sugar crops-sugarcane; medicinal and aromatic crops-mentha, lemon grass and citronella, Forage crops-berseem, lucerne and oat.

Practical

Sowing methods of wheat and sugarcane, identification of weeds in rabi season crops, study of morphological characteristics of rabi crops, study of yield contributing characters of rabi season crops, yield and juice quality analysis of sugarcane, study of important agronomic experiments of rabi crops at experimental farms. Study of rabi forage experiments, oil extraction of medicinal crops, visit to research stations of related crops.

B.Sc. Agriculture (Hons.)

FSC-222 Production Technology for Ornamental Crops, MAPs and Landscaping

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers. Production technology of important cut flowers like rose, gerbera, carnation, lilium and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions. Package of practices for loose flowers like marigold and jasmine under open conditions. Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rosegeranium, vetiver. Processing and value addition in ornamental crops and MAPs produce.

Practical

Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. Training and pruning of Ornamental plants. Planning and layout of garden. Bed preparation and planting of MAP. Protected structures – care and maintenance. Intercultural operations in flowers and MAP. Harvesting and post harvest handling of cut and loose flowers. Processing of MAP. Visit to commercial flower/MAP unit.

B.Sc. Agriculture (Hons.)

AEN-223 Renewable Energy & Green Technology

Time: 3 Hours

Max. Marks: 75
Theory: 40
Practical: 20
Internal assessment 15
Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

1. Classification of energy sources and their contribution in Agricultural sector.
2. Biomass utilization for bio-fuel production and their application , types of biogas plants.
3. Pyrolysis, gasification and types of Gasifiers.
4. Biogas, Bio-alcohol, Biodiesel and bio-oil production and their utilization as bio-energy resources, Briquetts and uses of briquetts and uses of briquettes.
5. Introduction to solar energy, Collection and their applications
6. Solar energy Gadgets : Solar cooker, solar water heater.
7. Application of Solar Energy ; Solar drying , Solar pond, Solar pump, Solar distillation, Solar photovoltaic system and their application.
8. Introduction to wind energy, types and their application.

Practical:

1. To study biogas plants.
2. To study Gasifiers.
3. To study the production process of bio diesel.
4. To study briquetting machine.
5. To study the production process of bio-fuels.
6. To study soar cooker.
7. To study solar drying system.
8. To study solar distillation.
9. To study the performance of wind mill.

B.Sc. Agriculture (Hons.)

SSC-224 **Problematic Soils and their Management**

Time: 3 Hours **Max. Marks: 50**

Theory: 40

Internal assessment =10

Periods per week 4+0

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties. Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils.

Irrigation water – quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils.

Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soils under different Agro-ecosystems.

B.Sc. Agriculture (Hons.)

FSC-225: Production Technology for Fruit and Plantation Crops

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment =15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Importance and scope of fruit and plantation crop industry in India; High density planting; Use of rootstocks; Production technologies for the cultivation of major fruits-mango, citrus, grape, plum, almond, guava, litchi, papaya, pear, peach and; minor fruits- pineapple, pomegranate, jackfruit, strawberry, cashew, tea, coffee..

Practical:

Seed propagation. Scarification and stratification of seeds. Propagation methods for fruit and plantation crops including Micro-propagation. Description and identification of fruit. Preparation of plant bio regulators and their uses, Identification of Pests, diseases and physiological disorders of above fruit and plantation crops, Visit to commercial orchard.

B.Sc. Agriculture (Hons.)

PBG-226 Principles of Seed Technology

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment :15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production. Seed quality- Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables. Seed certification, phases of certification, procedure for seed certification, field inspection. Seed Act and Seed Act enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983, Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test. Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops and organic seed production.

Seed drying, processing and their steps, seed testing for quality assessment, seed treatment, its importance, method of application and seed packing. Seed storage; general principles, stages and factors affecting seed longevity during storage. Measures for pest and disease control during storage. Seed marketing: structure and organization, sales, generation activities, promotional media. Factors affecting seed marketing, Role of WTO and OECD in seed marketing. Private and public sectors and their production and marketing strategies.

Practical:

Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi. Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea. Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard. Seed production in important vegetable crops. Seed sampling and testing: Physical purity, germination, viability, etc. Seed and seedling vigour test. Genetic purity test: Grow out test and Seed certification: Procedure, Field inspection, Preparation of field inspection report.

B.Sc. Agriculture (Hons.)

AGR- 227 Farming System and Sustainable Agriculture

Time: 3 Hours **Max. Marks: 50**

Theory: 40

Internal assessment 10

Periods per week 3+0

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system; Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability, Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones, resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field.

B.Sc. Agriculture (Hons.)

AGE-228 Agricultural Marketing, Trade and Prices

Time: 3 Hours **Max. Marks: 75**
Theory= 40
Practical=20
Internal Assessment :15
Periods per week 4+3

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, classification and characteristics of agricultural markets ; demand, supply and producer's surplus of agri commodities: nature and determinants of demand and supply of farm products, producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities Marketing process- concentration, dispersion and equalization; exchange functions – buying and selling; physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labeling (Agmark); Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel; number of channel levels; marketing channels for different farm products; Integration, efficiency, costs and price spread: Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs; Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions cooperative marketing in India; Risk in marketing: Types of risk in marketing; speculation & hedging; an overview of futures trading; Agricultural prices and policy: Meaning and functions of price; administered prices; need for agricultural price policy; Trade: Concept of International Trade and its need, theories of absolute and comparative advantage. Present status and prospects of international trade in agri-commodities; GATT and WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR.

Practical:

Study of relationship between market arrivals and prices of some selected commodities; Computation of marketable and marketed surplus of important commodities; Study of price behaviour over time for some selected commodities; To study various marketing functions performed by different agencies, identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class.

B.Sc. Agriculture (Hons.)

AGM-229: Introductory Agro-meteorology & Climate Change

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal Assessment 15

Periods per week 3+3

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Earth atmosphere- its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze; Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, longwave and thermal radiation, net radiation, albedo; Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, Energy balance of earth; Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification; Artificial rainmaking. Monsoon- mechanism and importance in Indian agriculture, Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave. Agriculture and weather relations; Modifications of crop microclimate, climatic normals for crop and livestock production. Weather forecasting- types of weather forecast and their uses. Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

Practical:

Visit of Agrometeorological Observatory, site selection of observatory, exposure of instruments and weather data recording. Measurement of total, shortwave and longwave radiation, and its estimation using Planck's intensity law. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS. Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis. Measurement of soil temperature and computation of soil heat flux. Determination of vapor pressure and relative humidity. Determination of dew point temperature. Measurement of atmospheric pressure and analysis of atmospheric conditions. Measurement of wind speed and wind direction, preparation of windrose. Measurement, tabulation and analysis of rain. Measurement of open pan evaporation and evapotranspiration. Computation of PET and AET.

B.Sc. Agriculture (Hons.)

PCV-2210 **Protected Cultivation**

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Protected cultivation- importance and scope, Status of protected cultivation in India and World types of protected structure based on site and climate. Cladding material involved in greenhouse/ poly house. Greenhouse design, environment control, artificial lights, Automation. Soil preparation and management, Substrate management. Types of benches and containers. Irrigation and fertigation management. Propagation and production of quality planting material of horticultural crops. Greenhouse cultivation of important horticultural crops – rose, carnation, chrysanthemum, gerbera, orchid, anthurium, lilium, tulip, tomato, bell pepper, cucumber, strawberry, pot plants, etc. Cultivation of economically important medicinal and aromatic plants. Off-season production of flowers and vegetables. Insect pest and disease management.

Practical:

Raising of seedlings and saplings under protected conditions, use of portrays in quality planting material production, Bed preparation and planting of crop for production, Inter cultural operations, Soil EC and pH measurement, Regulation of irrigation and fertilizers through drip, fogging ad misting.

B.Sc. Agriculture (Hons.)

BPF-2210 **Biopesticides & Biofertilizers**

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

History and concept of biopesticides. Importance, scope and potential of biopesticide. Definitions, concepts and classification of biopesticides viz. pathogen, botanical pesticides, and biorationales. Botanicals and their uses. Mass production technology of bio-pesticides. Virulence, pathogenicity and symptoms of entomopathogenic pathogens and nematodes. Methods of application of biopesticides. Methods of quality control and Techniques of biopesticides. Impediments and limitation in production and use of biopesticide. Biofertilizers – Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- *Azospirillum, Azotobacter, Bacillus, Pseudomonas, Rhizobium* and *Frankia*; Cynobacterial biofertilizers- *Anabaena, Nostoc,* Hapalosiphon and fungal biofertilizers- AMmycorrhiza and ectomycorhiza. Nitrogen fixation –Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K solubilization. Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertiizers. FCO specifications and quality control of biofertilizers. Application technology for seeds, seedlings, tubers, sets etc. Biofertilizers –Storage, shelf life, quality control and marketing. Factors influencing the efficacy of biofertilizers.

Practical:

Isolation and purification of important biopesticides: *Trichoderma Pseudomonas, Bacillus, Metarhyzium* etc. and its production. Identification of important botanicals. Visit to biopesticide laboratory in nearby area. Field visit to explore naturally infected cadavers. Identification of entomopathogenic entities in field condition. Quality control of biopesticides. Isolation and purification of *Azospirillum , Azotobacter, Rhizobium*, P-solubilizers and cyanobacteria. Mass multiplication and inoculums production of biofertilizers. Isolation of AM fungi –Wet sieving method and sucrose gradient method. Mass production of AM inoculants.

B.Sc. Agriculture (Hons.)

CPB-2210 Commercial Plant Breeding

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Types of crops and modes of plant reproduction. Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production. Genetic purity test of commercial hybrids. Advances in hybrid seed production of maize, rice, sorghum, pearl millet, castor, sunflower, cotton pigeon pea, Brassica etc. Quality seed production of vegetable crops under open and protected environment. Alternative strategies for the development of the line and cultivars: haploid inducer, tissue culture techniques and biotechnological tools. IPR issues in commercial plant breeding: DUS testing and registration of varieties under PPV & FR Act. Variety testing, release and notification systems in India. Principles and techniques of seed production, types of seeds, quality testing in self and cross pollinated crops.

Practical:

Floral biology in self and cross pollinated species, selfing and crossing techniques. Techniques of seed production in self and cross pollinated crops using A/B/R and two line system. Learning techniques in hybrid seed production using male-sterility in field crops. Understanding the difficulties in hybrid seed production, Tools and techniques for optimizing hybrid seed production. Concept of rouging in seed production plot. Concept of line its multiplication and purification in hybrid seed production. Role of pollinators in hybrid seed production. Hybrid seed production techniques in sorghum, pearl millet, maize, rice, rapeseed-mustard, sunflower, castor, pigeon pea, cotton and vegetable crops. Sampling and analytical procedures for purity testing and detection of spurious seed. Seed drying and storage structure in quality seed management. Screening techniques during seed processing viz., grading and packaging. Visit to public private seed production and processing plants.

B.Sc. Agriculture (Hons.)

AGR-311 Practical Crop Production-I *(Kharif Crops)*

Time: 3 Hours **Max. Marks: 50**
Practical: 40
Internal assessment 10
Periods per week 0+4

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Practical

Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

B.Sc. Agriculture (Hons.)

PPL-312 Principles of Integrated Pest and Disease Management

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Categories of insect pests and diseases, IPM: Introduction, history, importance, concepts, principles and tools of IPM. Economic importance of insect pests, diseases and pest risk analysis. Methods of detection and diagnosis of insect pest and diseases. Calculation and dynamics of economic injury level and importance of Economic threshold level. Methods of control: Host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control. Ecological management of crop environment. Introduction to conventional pesticides for the insect pests and disease management. Survey surveillance and forecasting of Insect pest and diseases. Development and validation of IPM module. Implementation and impact of IPM (IPM module for Insect pest and disease. Safety issues in pesticide uses. Political, social and legal implication of IPM.

Practical

Methods of diagnosis and detection of various insect pests, and plant diseases, Methods of insect pests and plant disease measurement, Assessment of crop yield losses, calculations based on economics of IPM,Identification of biocontrol agents, different predators and natural enemies. Mass multiplication of *Trichoderma, Pseudomona*s, *Trichogramma*, NPV etc. Identification and nature of damage of important insect pests and diseases and their management. Crop (agroecosystem) dynamics of a selected insect pest and diseases. Plan & assess preventive strategies (IPM module) and decision making. crop monitoring attacked by insect, pest and diseases . Awareness campaign at farmers fields.

B.Sc. Agriculture (Hons.)

SSC-313 Manures, Fertilizers and Soil Fertility Management

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring. Fertilizer recommendation approaches. Integrated nutrient management. Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary & micronutrient fertilizers, Complex fertilizers, nano fertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order. History of soil fertility and plant nutrition. criteria of essentiality. role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

Practical

Introduction of analytical instruments and their principles, calibration and applications, Colorimetry and flame photometry. Estimation of soil organic carbon, Estimation of alkaline hydrolysable N in soils. Estimation of soil extractable P in soils. Estimation of exchangeable K; Ca and Mg in soils . Estimation of soil extractable S in soils.. Estimation of DTPA extractable Zn in soils. Estimation of N in plants. Estimation of P in plants. Estimation of K in plants. Estimation of S in plants.

B.Sc. Agriculture (Hons.)

ENT-314 Pests of Crops and Stored Grains and their Management

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

General account on nature and type of damage by different arthropods pests. Scientific name, order, family, host range, distribution, biology and bionomics, nature of damage, and management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various field crop, vegetable crop, fruit crop, plantation crops, ornamental crops, spices and condiments. Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain. Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management.

Practical

Identification of different types of damage. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops; (b) Vegetable Crops; (c) Fruit Crops; (d) Plantation, gardens, Narcotics, spices & condiments. Identification of insect pests and Mites associated with stored grain. Determination of insect infestation by different methods. Assessment of losses due to insects. Calculations on the doses of insecticides application technique. Fumigation of grain store / godown. Identification of rodents and rodent control operations in godowns. Identification of birds and bird control operations in godowns. Determination of moisture content of grain. Methods of grain sampling under storage condition.

B.Sc. Agriculture (Hons.)

PPL-315 Diseases of Field & Horticultural Crops & their Management-I

Time: 3 Hours **Max. Marks: 75**
Theory: 40
Practical: 20
Internal assessment 15
Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Symptoms, etiology, disease cycle and management of major diseases of following crops:
Field Crops: Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro; **Maiz**e: stalk rots, downy mildew, leaf spots; Sorghum: smuts, grain mold and anthracnose, **Bajra** :downy mildew and ergot; **Groundnut:** early and late leaf spots, wilt **Soybean:** Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic; **Pigeonpea:** Phytophthora blight, wilt and sterility mosaic; **Finger millet**: Blast and leaf spot; **black & green gram:** Cercospora leaf spot and anthracnose, web blight and yellow mosaic; **Castor:** Phytophthora blight; **Tobacco:** black shank, black root rot and mosaic.
Horticultural Crops: Guava: wilt and anthracnose; **Banana:** Panama wilt, bacterial wilt, Sigatoka and bunchy top; **Papaya:** foot rot, leaf curl and mosaic, **Pomegranate:** bacterial blight; **Cruciferous vegetables**: Alternaria leaf spot and black rot; **Brinjal:** Phomopsis blight and fruit rot and Sclerotinia blight; **Tomato:** damping off, wilt, early and late blight, buck eye rot and leaf curl and mosaic; **Okra:** Yellow Vein Mosaic; **Beans:** anthracnose and bacterial blight; **Ginger:** soft rot; **Colocasia**: Phytophthora blight; **Coconut:** wilt and bud rot; **Tea:** blister blight; **Coffee:** rust

Practical

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Collection and preservation of plant diseased specimens for Herbarium;

Note: Students should submit 50 pressed and well-mounted specimens/ photographs giving systematic position and brief description of symptoms.

B.Sc. Agriculture (Hons.)

PBG-316 Crop Improvement – I (*Kharif*)

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fibres; fodders and cash crops; vegetable and horticultural crops; Plant genetic resources, its utilization and conservation, study of genetics of qualitative and quantitative characters; Important concepts of breeding self pollinated, cross pollinated and vegetatively propagated crops; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Hybrid seed production technology in Maize, Rice, Sorghum, Pearl millet and Pigeonpea, etc. Ideotype concept and climate resilient crop varieties for future.

Practical

Floral biology, emasculation and hybridization techniques in different crop species; viz., Rice, Jute, Maize, Sorghum, Pearl millet, Ragi, Pigeonpea, Urdbean, Mungbean, Soybean, Groundnut, Seasame, Caster, Cotton, Cowpea, Tobacco, Brinjal, Okra and Cucurbitaceous crops. Maintenance breeding of different *kharif* crops. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed descent methods; Study of field techniques for seed production and hybrid seeds production in *Kharif* crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments; Study of quality characters, donor parents for different characters;

B.Sc. Agriculture (Hons.)

AGE-317 Entrepreneurship Development and Business Communication

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs; SWOT Analysis & achievement motivation, Government policy and programs and institutions forentrepreneurship development, Impact of economic reforms on Agribusiness/ Agrienterprises, Entrepreneurial Development Process; Business Leadership Skills; Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation), Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skill, Supply chain management and Total quality management, Project Planning Formulation and report preparation; Financing of enterprise, Opportunities for agri-entrepreneurship and rural enterprise.

Practical

Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement motivation, exercise in creativity, time audit through planning, monitoring and supervision, identification and selection of business idea, preparation of business plan and proposal writing,

B.Sc. Agriculture (Hons.)

AGR-318 Geoinformatics, Nano-technology and Precision Farming

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture; Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture. Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; Spatial data and their management in GIS; Remote sensing concepts and application in agriculture; Image processing and interpretation; Global positioning system (GPS), components and its functions; Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; STCR approach for precision agriculture; Nanotechnology, definition, concepts and techniques, brief introduction about nanoscale effects, nano-particles, nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in seed, water, fertilizer, plant protection for scaling-up farm productivity.

Practical

Introduction to GIS software, spatial data creation and editing. Introduction to image processing software. Visual and digital interpretation of remote sensing images. Generation of spectral profiles of different objects. Supervised and unsupervised classification and acreage estimation. Multispectral remote sensing for soil mapping. Creation of thematic layers of soil fertility based on GIS. Creation of productivity and management zones. Fertilizers recommendations based of VRT and STCR techniques. Crop stress (biotic/abiotic) monitoring using geospatial technology. Use of GPS for agricultural survey. Formulation, characterization and applications of nanoparticles in agriculture. Projects formulation and execution related to precision farming.

B.Sc. Agriculture (Hons.)

IPR-319 **Intellectual Property Rights**

Time: 3 Hours **Max. Marks: 50**

Theory: 40

Internal assessment 10

Periods per week 3+0

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs and WIPO, Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc. Types of Intellectual Property and legislations covering IPR in India:-Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database. Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India, Plant breeders rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights. Traditional knowledge-meaning and rights of TK holders. Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing.

B.Sc. Agriculture (Hons.)

PCV-3110 **Protected Cultivation**

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Protected cultivation- importance and scope, Status of protected cultivation in India and World types of protected structure based on site and climate. Cladding material involved in greenhouse/ poly house. Greenhouse design, environment control, artificial lights, Automation. Soil preparation and management, Substrate management. Types of benches and containers. Irrigation and fertigation management. Propagation and production of quality planting material of horticultural crops. Greenhouse cultivation of important horticultural crops – rose, carnation, chrysanthemum, gerbera, orchid, anthurium, lilium, tulip, tomato, bell pepper, cucumber, strawberry, pot plants, etc. Cultivation of economically important medicinal and aromatic plants. Off-season production of flowers and vegetables. Insect pest and disease management.

Practical:

Raising of seedlings and saplings under protected conditions, use of portrays in quality planting material production, Bed preparation and planting of crop for production, Inter cultural operations, Soil EC and pH measurement, Regulation of irrigation and fertilizers through drip, fogging ad misting.

B.Sc. Agriculture (Hons.)

BPF-3110 Biopesticides & Biofertilizers

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

History and concept of biopesticides. Importance, scope and potential of biopesticide. Definitions, concepts and classification of biopesticides viz. pathogen, botanical pesticides, and biorationales. Botanicals and their uses. Mass production technology of bio-pesticides. Virulence, pathogenicity and symptoms of entomopathogenic pathogens and nematodes. Methods of application of biopesticides. Methods of quality control and Techniques of biopesticides. Impediments and limitation in production and use of biopesticide. Biofertilizers – Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- *Azospirillum, Azotobacter, Bacillus, Pseudomonas, Rhizobium* and *Frankia*; Cynobacterial biofertilizers- *Anabaena, Nostoc,* Hapalosiphon and fungal biofertilizers- AMmycorrhiza and ectomycorhiza. Nitrogen fixation –Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K solubilization. Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertiizers. FCO specifications and quality control of biofertilizers. Application technology for seeds, seedlings, tubers, sets etc. Biofertilizers –Storage, shelf life, quality control and marketing. Factors influencing the efficacy of biofertilizers.

Practical:

Isolation and purification of important biopesticides: *Trichoderma Pseudomonas, Bacillus, Metarhyzium* etc. and its production. Identification of important botanicals. Visit to biopesticide laboratory in nearby area. Field visit to explore naturally infected cadavers. Identification of entomopathogenic entities in field condition. Quality control of biopesticides. Isolation and purification of *Azospirillum , Azotobacter, Rhizobium*, P-solubilizers and cyanobacteria. Mass multiplication and inoculums production of biofertilizers. Isolation of AM fungi –Wet sieving method and sucrose gradient method. Mass production of AM inoculants.

B.Sc. Agriculture (Hons.)

CPB-3110 Commercial Plant Breeding

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Types of crops and modes of plant reproduction. Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production. Genetic purity test of commercial hybrids. Advances in hybrid seed production of maize, rice, sorghum, pearl millet, castor, sunflower, cotton pigeon pea, Brassica etc. Quality seed production of vegetable crops under open and protected environment. Alternative strategies for the development of the line and cultivars: haploid inducer, tissue culture techniques and biotechnological tools. IPR issues in commercial plant breeding: DUS testing and registration of varieties under PPV & FR Act. Variety testing, release and notification systems in India. Principles and techniques of seed production, types of seeds, quality testing in self and cross pollinated crops.

Practical:

Floral biology in self and cross pollinated species, selfing and crossing techniques. Techniques of seed production in self and cross pollinated crops using A/B/R and two line system. Learning techniques in hybrid seed production using male-sterility in field crops. Understanding the difficulties in hybrid seed production, Tools and techniques for optimizing hybrid seed production. Concept of rouging in seed production plot. Concept of line its multiplication and purification in hybrid seed production. Role of pollinators in hybrid seed production. Hybrid seed production techniques in sorghum, pearl millet, maize, rice, rapeseed-mustard, sunflower, castor, pigeon pea, cotton and vegetable crops. Sampling and analytical procedures for purity testing and detection of spurious seed. Seed drying and storage structure in quality seed management. Screening techniques during seed processing viz., grading and packaging. Visit to public private seed production and processing plants.

B.Sc. Agriculture (Hons.)

ACH-3111 **Agrochemicals**

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

An introduction to agrochemicals, their type and role in agriculture, effect on environment, soil, human and animal health, merits and demerits of their uses in agriculture, management of agrochemicals for sustainable agriculture. Herbicides-Major classes, properties and important herbicides. Fate of herbicides. Fungicides - Classification – Inorganic fungicides - characteristics, preparation and use of sulfur and copper, Mode of action-Bordeaux mixture and copper oxychloride. Organic fungicides- Mode of action-Dithiocarbamates-characteristics, preparation and use of Zineb and maneb. Systemic fungicides-Benomyl, carboxin, oxycarboxin, Metalaxyl, Carbendazim, characteristics and use. Introduction and classification of insecticides: inorganic and organic insecticides Organochlorine, Organophosphates, Carbamates, Synthetic pyrethroids Neonicotinoids, Biorationals, Insecticide Act and rules, Insecticides banned, withdrawn and restricted use, Fate of insecticides in soil & plant. IGRs Biopesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses. Fertilizers and their importance. Nitrogenous fertilizers: Feedstocks and Manufacturing of ammonium sulphate, ammonium nitrate, ammonium chloride, urea. Slow release N-fertilizers. Phosphatic fertilizers: feedstock and manufacturing of single superphosphate. Preparation of bone meal and basic slag. Potassic fertilizers: Natural sources of potash, manufacturing of potassiumchloride, potassium sulphate and potassium nitrate. Mixed and complex fertilizers: Sources and compatibility–preparation of major, secondary and micronutrient mixtures. Complex fertilizers: Manufacturing of ammonium phosphates, nitrophosphates and NPK complexes. Fertilizer control order. Fertilizer logistics and marketing. Plant bio-pesticides for ecological agriculture, Bio-insect repellent.

Practical:

Sampling of fertilizers and pesticides. Pesticides application technology to study about various pesticides appliances. Quick tests for identification of common fertilizers. Identification of anion and cation in fertilizer. Calculation of doses of insecticides to be used. To study and identify various formulations of insecticide available kin market. Estimation of nitrogen in Urea. Estimation of water soluble P2O5 and citrate soluble P2O5 in single super phosphate. Estimation of potassium in Muraite of Potash/ Sulphate of Potash by flame photometer. Determination of copper content in copper oxychloride. Determination of sulphur content in sulphur fungicide. Determination of thiram. Determination of ziram content.

B.Sc. Agriculture (Hons.)

SPW-3111 SOIL, PLANT, WATER AND SEED TESTING

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Principle of pH meter, EC meter, spectrophotometer, flame photometer and AAS. Soil analysis: Objectives, sampling of soil, procedure and precautions. Determination of texture, bulk density. Interpretation of analytical data viz., pH, EC, organic carbon, N, P, K, S and micronutrients (Fe, Mn, Zn, Cu, B) and nutrient index. Plant analysis: Sampling stages and plant part to be sampled. Analysis of nutrients, Quantitative rating of plant analysis data and interpretation of results, critical nutrient concentration, critical nutrient ranges. Water analysis: Quality criteria, classification and suitability of irrigation water and water quality index. Use of soil testing kit for major and micronutrient analysis. Seed: Introduction, definition and importance, seed germination, viability, vigor and storage.

Practical:

Standardization of solutions and reagents, collection and preparation of soil samples, estimation of pH, EC, organic carbon, NPKS, micronutrients, CEC and exchangeable sodium in soil. Determination of EC and pH of saturation extract/paste. Estimation of cations and anions. Plant sampling and sample preparation for analysis, digestion of plant material and estimation of N, P, K in plant. Rapid plant tissue test for N, P, and K. Determination of EC, pH, cations (Ca++,Mg++,Na+, K+) and anions (B, CO3 - -, HCO3- , Cl-) in irrigation water . Computation of SAR and RSC. Seed quality testing: Germination, viability, moisture and vigor.

B.Sc. Agriculture (Hons.)

AWM-3111 AGRICULTURAL WASTE MANAGEMENT

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Introduction to agricultural waste management, Nature and characteristics of agricultural waste and their impact on the environment, Kinds of wastes, Classification, role of soil and plants in waste management, sources of waste, impact of waste on soil and plant quality, Biological processes of waste management, Utilization and Recycling of Agricultural waste, Potential of Recyclable Crop Residues and its management, Insitutional management of agriculture waste, Composting and Vermicomposting for bio conservation of biodegradable waste, Biogas Technology, Agricultural waste and water, air and animal resources, Impacts of waste on human, animal health and environment. Management of bedding & litter, wasted feed, run-off from feed lots and holding areas and waste water from dairy parlors, agro-waste recycling through farming system, waste management machineries, environmental benefit of waste management.

Practical:

Collection and preparation of agricultural waste sample. Determination of pH, EC, CECe, heavy metals, BOD, COD, TSS, TDS, NH4, Total P, and dissolved reactive P. Nutrient status (N, P, K, secondary and micronutrients) analysis of agricultural waste. Waste management equipment operation, Maintenance and safety hazards, computer software and models. Survey of different agri waste from live-stock, dairy, poultry, food processing, fruit & vegetable and agri-chemicals, Preparation of compost, vermicomposting, biogas and analysis of compost.

B.Sc. Agriculture (Hons.)

HVE-1111* **Human Values and Ethics**

Time: 3 Hours **Max. Marks: 50**

Theory: 40

Internal Assessment 10

Periods per week 2+0

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Universal human aspirations: Happiness and prosperity; Human values and ethics: Concept, Definition, significance and sources; Fundamental values: Right conduct, peace, truth, love and non-violence; Ethics: professional, environmental, ICT; Sensitization towards others particularly senior citizens, developmentally challenged and gender. Spirituality, positive attitude and scientific temper; Team work and volunteering; Rights and responsibilities; Road safety; Human relations and family harmony; Modern challenges and value conflict: Sensitization against drug abuse and other social evils; Developing personal code of conduct (SWOT Analysis); Management of anger and stress.

B.Sc. Agriculture (Hons.)

AGR-321 Practical Crop Production-II *(Rabi Crops)*

Time: 3 Hours **Max. Marks: 50**
Practical: 40
Internal assessment 10
Periods per week 0+4

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Practical

Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

B.Sc. Agriculture (Hons.)

AGR-322 Rainfed Agriculture and Watershed Management

Time: 3 Hours **Max. Marks: 75**
Theory: 40
Practical: 20
Internal assessment 15
Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershed in India; Problems and prospects of rainfed agriculture in India ; Soil and climatic conditions prevalent in rainfed areas; Soil and water conservation techniques, Drought: types, effect of water deficit on physio-morphological characteristics of the plants, Crop adaptation and mitigation to drought; Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices,Management of crops in rainfed areas, Contingent crop planning for aberrant weather conditions, Concept, objective, principles and components of watershed management, factors affecting watershed management.

Practical

Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons. Studies on cropping pattern of different rainfed areas in the country and demarcation of rainfed area on map of India. Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops. Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation. Studies on cultural practices for mitigating moisture stress. Characterization and delineation of model watershed. Field demonstration on soil & moisture conservation measures. Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed

B.Sc. Agriculture (Hons.)

AEN-323 Protected Cultivation and Secondary Agriculture

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes. Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house drying. Cost estimation and economic analysis.

Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation. Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

Practical

Study of different type of green houses based on shape. Determine the rate of air exchange in an active summer winter cooling system. Determination of drying rate of agricultural products inside green house. Study of green house equipments. Determination of Moisture content of various grains by oven drying & infrared moisture methods. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.

B.Sc. Agriculture (Hons.)

PPL-324 Diseases of Field & Horticultural Crops & their Management-II

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Symptoms, etiology, disease cycle and management of following diseases:

Field Crops: **Wheat:** rusts, loose smut, karnal bunt, powdery mildew, alternaria blight, and ear cockle; **Sugarcane:** red rot, smut, wilt, grassy shoot, ratoon stunting and Pokkah Boeng; **Sunflower**: Sclerotinia stem rot and Alternaria blight; **Mustard:** Alternaria blight, white rust, downy mildew and Sclerotinia stem rot; **Gram:** wilt, grey mould and Ascochyta blight; **Lentil:** rust and wilt; **Cotton:** anthracnose, vascular wilt, and black arm; **Pea:** downy mildew, powdery mildew and rust.

Horticultural Crops: Mango: anthracnose, malformation, bacterial blight and powdery mildew; **Citrus:** canker and gummosis; **Grape vine:** downy mildew, powdery mildew and anthracnose; **Apple:** scab, powdery mildew, fire blight and crown gall; **Peach:** leaf curl. **Strawberry:** leaf spot **Potato:** early and late blight, black scurf, leaf roll, and mosaic; **Cucurbits:** downy mildew, powdery mildew, wilt; **Onion** and **garlic:** purple blotch, and Stemphylium blight; **Chillies:** anthracnose and fruit rot, wilt and leaf curl; **Turmeric:** leaf spot **Coriander:** stem gall Marigold: Botrytis blight; **Rose:** dieback, powdery mildew and black leaf spot.

Practical

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems.

Note: Collection and preservation of plant diseased specimens for herbarium/photographs with systematic position and brief description of symptoms.

B.Sc. Agriculture (Hons.)

FSC-325 Post-harvest Management and Value Addition of Fruits and Vegetables

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Importance of post-harvest processing of fruits and vegetables, extent and possible causes of post harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Drying/ Dehydration of fruits and vegetables –packaging of products.

Practical

Applications of different types of packaging, containers for shelf life extension. Effect of temperature on shelf life and quality of produce. Demonstration of chilling and freezing injury in vegetables and fruits. Extraction and preservation of pulps and juices. Preparation of jam, jelly, RTS, nectar, squash, tomato products. Quality evaluation of products -- physico-chemical and sensory. Visit to processing unit/ industry.

B.Sc. Agriculture (Hons.)

ENT-326 **Management of Beneficial Insects**

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants. Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons. Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection. Species of lac insect, morphology, biology, host plant, lac production – seed lac, button lac, shellac, lac- products. Identification of major parasitoids and predators commonly being used in biological control.
Insect orders bearing predators and parasitoids used in pest control and their mass multiplication techniques. Important species of pollinator, weed killers and scavengers with their importance.

Practical

Honey bee species, castes of bees. Beekeeping appliances and seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Species of lac insect, host plant identification. Identification of other important pollinators, weed killers and scavengers. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies. Identification and techniques for mass multiplication of natural enemies.

B.Sc. Agriculture (Hons.)

PBG-327 **Crop Improvement – II (*Rabi*)**

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fodder crops and cash crops; vegetable and horticultural crops; Plant genetic resources, its utilization and conservation; study of genetics of qualitative and quantitative characters; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Hybrid seed production technology of *rabi* crops. Ideotype concept and climate resilient crop varieties for future.

Practical

Floral biology, emasculation and hybridization techniques in different crop species, namely, Wheat, Oat, Barley, Chickpea, Lentil, Field pea, Rajma, Horse gram, Rapeseed Mustard, Sunflower, Safflower, Potato, Berseem. Sugarcane, Tomato, Chilli, Onion; Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed descent methods; Study of field techniques for seed production and hybrid seeds production in *Rabi* crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments; Study of quality characters, study of donor parents for different characters;

B.Sc. Agriculture (Hons.)

AGR-328 Principles of Organic Farming

Time: 3 Hours **Max. Marks: 75**
Theory: 40
Practical: 20
Internal assessment 15
Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Organic farming, principles and its scope in India; Initiatives taken by Government (central/ state), NGOs and other organizations for promotion of organic agriculture; Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production; Operational structure of NPOP; Certification process and standards of organic farming; Processing, leveling, economic considerations and viability, marketing and export potential of organic products.

Practical

Visit of organic farms to study the various components and their utilization; Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis; Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management; Cost of organic production system; Post harvest management; Quality aspect, grading, packaging and handling.

B.Sc. Agriculture (Hons.)

AGE-329 Farm Management, Production and Resource Economics

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 3+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms. Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and productproduct relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage. Meaning and concept of cost, types of costs and their interrelationship, importance of cost in managing farm business and estimation of gross farm income, net farm income, family labour income and farm business income Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts. Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting. Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies**,** Crop/livestock/machinery insurance – weather based crop insurance, features, determinants of compensation. Positive and negative externalities in agriculture, Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.

Practical

Preparation of farm layout. Determination of cost of fencing of a farm. Computation of depreciation cost of farm assets. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources. Determination of most profitable level of inputs use in a farm production process. Determination of least cost combination of inputs. Selection of most profitable enterprise combination. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts.

B.Sc. Agriculture (Hons.)

FST-3210 Principles of Food Science and Nutrition

Time: 3 Hours **Max. Marks: 50**
Theory: 40
Internal assessment 10
Periods per week 4+0

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory

Concepts of Food Science (definitions, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems etc.); Food composition and chemistry (water, carbohydrates, proteins, fats, vitamins, minerals, flavours, colours, miscellaneous bioactives, important reactions); Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production of fermented foods); Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.); Food and nutrition, Malnutrition (over and under nutrition), nutritional disorders; Energy metabolism (carbohydrate, fat, proteins); Balanced/ modified diets, Menu planning, New trends in food science and nutrition.

B.Sc. Agriculture (Hons.)

BIT-3211 **Principles of Plant Biotechnology**

Time: 3 Hours **Max. Marks: 50**

Theory= 25

Practical = 15

Internal Assessment =10

Periods per week 2+2

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Concepts and applications of plant biotechnology: Scope, organ culture, embryo culture, cell suspension culture, callus culture, another culture, pollen culture and ovule culture and their applications; Micro-propagation methods; organogenesis and embryogenesis, Synthetic seeds and their significance; Embryo rescue and its significance; somatic hybridization and cybrids; Somaclonal variation and its use in crop improvement; cryo-preservation; Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and Agrobacterium mediated gene transfer methods; Transgenics and its importance in crop improvement; PCR techniques and its applications; RFLP, RAPD, SSR; Marker Assisted Breeding in crop improvement; Biotechnology regulations.

Practical:

Sterilization techniques: Composition of various tissue culture, media and preparation of stock solutions for MS nutrient medium. Callus induction from various explants. Micro-propagation.

B.Sc. Agriculture (Hons.)

ABM-3212 **Agri-business Management**

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Transformation of agriculture into agribusiness, various stakeholders and components of agribusiness systems. Importance of agribusiness in the Indian economy and New Agricultural Policy. Distinctive features of Agribusiness Management: Importance and needs of agro-based industries, Classification of industries and types of agro based industries. Institutional arrangement, procedures to set up agro based industries. Constraints in establishing agro-based industries. Agri-value chain: Understanding primary and support activities and their linkages. Business environment: PEST & SWOT analysis. Management functions: Roles & activities, Organization culture. Planning, meaning, definition, types of plans. Purpose or mission, goals or objectives, Strategies, polices procedures, rules, programs and budget. Components of a business plan, Steps in planning and implementation. Organization staffing, directing and motivation. Ordering, leading, supervision, communications, control. Capital Management and Financial management of Agribusiness. Financial statements and their importance. Marketing Management: Segmentation, targeting & positioning. Marketing mix and marketing strategies. Consumer behaviour analysis, Product Life Cycle (PLC). Sales & Distribution Management. Pricing policy, various pricing methods. Project Management definition, project cycle, identification, formulation, appraisal, implementation, monitoring and evaluation. Project Appraisal and evaluation techniques.

Practical:

Study of agri-input markets: Seed, fertilizers, pesticides. Study of output markets: grains, fruits, vegetables, flowers. Study of product markets, retails trade commodity trading, and value added products. Study of financing institutions- Cooperative, Commercial banks, RRBs, Agribusiness Finance Limited, NABARD. Preparations of projects and Feasibility reports for agribusiness entrepreneur. Appraisal/evaluation techniques of identifying viable project- Non-discounting techniques. Case study of agro-based industries. Trend and growth rate of prices of agricultural commodities. Net present worth technique for selection of viable project. Internal rate of return.

B.Sc. Agriculture (Hons.)

WMG-3212 **Weed Management**

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Introduction to weeds, characteristics of weeds their harmful and beneficial effects on ecosystem. Classification, reproduction and dissemination of weeds. Herbicide classification, concept of adjuvant, surfactant, herbicide formulation and their use. Introduction to mode of action of herbicides and selectivity. Allelopathy and its application for weed management. Bio-herbicides and their application in agriculture. Concept of herbicide mixture and utility in agriculture. Herbicide compatibility with agro-chemicals and their application. Integration of herbicides with non chemical methods of weed management. Herbicide Resistance and its management.

Practical:

Techniques of weed preservation. Weed identification and their losses study. Biology of important weeds. Study of herbicide formulations and mixture of herbicide. Herbicide and agrochemicals study. Shift of weed flora study in long term experiments. Study of methods of herbicide application, spraying equipments. Calculations of herbicide doses and weed control efficiency and weed index.

B.Sc. Agriculture (Hons.)

LSP-3212 **Landscaping**

Time: 3 Hours **Max. Marks: 75**

Theory: 40

Practical: 20

Internal assessment 15

Periods per week 4+3

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes. Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting, Annuals: selection, propagation, planting scheme, Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

Practical:

Identification of trees, shrubs, annuals, pot plants; Propagation of trees, shrubs and annuals, care and maintenance of plants, potting and repotting, identification of tools and implements used in landscape design, training and pruning of plants for special effects, lawn establishment and maintenance, layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house. Use of computer software, visit to important gardens/ parks/ institutes.

B.Sc. Agriculture (Hons.)

FSC-411 Nursery Management of Horticultural Crops

Time: 3 Hours **Max. Marks: 150**
Theory: 80
Practical: 40
Internal Assessment: 30
Periods per Week 4+3

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Principles of plant propagation. Seed dormancy and germination. Selection of rootstock and scion. Stock scion relationship. Factors affecting successful propagation. Physiology of dwarfing rootstock. Different methods of propagation like division, cutting, layering, budding and grafting, and tissue culture. Containers, media and mixtures. Propagation structures. Nursery act, quarantine and certification. Nutrient management and plant protection measures in nursery. Economics of raising fruit plant nursery.

Practical: Raising of rootstock. Methods to break seed dormancy. Propagation techniques. Training, lifting and packing of nursery plants. Preparation of media and mixtures, and raising nursery in poly bags. Project formulation and valuation of nursery raising.

B.Sc. Agriculture (Hons.)

FSC-412 **Fundamentals of Fruit Production**

Time: 3 Hours **Max. Marks: 100**
Theory: 60
Practical: 20
Internal Assessment: 20
Periods per Week 4+3

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Climatic classification of fruits in Punjab & India. Climate as a limiting factor in Horticulture, Principles of orchard planning, selection of site for establishing an orchard. Winter killing and hardiness. Protection of fruit against adverse climatic conditions. Water requirement of fruit crops and factors influencing it. Critical period of water supply, The response of fruits plants to varying conditions of soil moisture and humidity. Orchard soil management methods. Their relation to moisture conservation and nutrient supply. Soil improvement and maintenance of organic matter in the soil. Detection of nutrient deficiency in the orchards. Method and time of application, Role of different elements in Horticulture.

Problems of pollination and fruit set. Factors associated with fruit setting and development of fruits.(Internal & External factors). Role of growth regulators in fruit set, fruit development and maturity of fruits. Pollen viability and germination; stigma receptivity and pollination studies in fruits.

Practical:

Nomenclature and identification of fruit plants, Planning and layout of an orchard, Planting of an orchard, Study of different methods of irrigation of fruit crops, Calculate water requirement of fruit crops, Study of different cultural practices adopted in the orchards, Weeds and their management in fruit crops, Protection of fruit plants against adverse weather conditions, Manuring and fertilization of fruit crops, Identification and management of nutritional deficiencies in fruit crops, Collection of soil and leaf samples for diagnosis of nutritional deficiencies, Study of bearing habits of fruits, Types of inflorescence in fruit crops, Role of growth regulators in fruit plants.

B.Sc. Agriculture (Hons.)

VSC-413 Commercial Vegetable Production

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment: 30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Role of soil, climatic and agronomic factors in vegetable production. Principles of cultivation including direct sowing, nursery management, transplanting, hardening of seedlings and vegetable forcing. Weeds and their control. Rotation and Intercropping in vegetable crops. Export potentiality, postharvest handling, processing, storage and marketing of vegetables.

Practical:

Sowing and transplanting of vegetable crops. Effect of soil conditions on seedling emergence and plant growth. Nutrient deficiency symptoms. Common weeds, their identification and control. Project formulation and evaluation for vegetable nursery production and vegetable forcing techniques.

B.Sc. Agriculture (Hons.)

VSC-414 Vegetable Breeding and Seed Production

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment: 30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Scope of vegetable breeding and seed production. Origin, floral biology and breeding systems in vegetable crops. Germplasm resources. Principles and methods of breeding self-pollinated, often cross-pollinated and cross- pollinated vegetable crops. Plant introduction, selection, hybridization, population improvement, mutation and polyploidy. Seed production of conventional varieties. Production of F1 hybrids using male sterility, self-incompatibility, various sex-forms etc. Methods of production of nucleus, breeder, foundation and certified seeds isolation, pollination, seed harvesting, processing and storage. Seed testing and certification. Seed Act. Vegetable seed industry and its problems.

Practical:

Study of inflorescence and flower structures. Practice in emasculation and artificial pollination. Inspection and rouging. Testing of seeds for purity and germination. Project formulation and evaluation for seed production of vegetable crops.

B.Sc. Agriculture (Hons.)

AGR-411 **Weed Management**

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment: 30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Weeds- Introduction, harmful and beneficial effects, characteristics and classification. Weed biology and ecology. Crop weed association, competition and allelopathy. Concepts of weed prevention, control and eradication. Methods of weed control. Physical, cultural, chemical, biological and integrated weed management. Herbicides- classification, formulation, advantages ,disadvantages and methods of application. Introduction to adjuvant and their use in herbicides. Introduction to selectivity of herbicides. Mode of action and fate of herbicides in soil. Compatibility of herbicides with other agrochemicals. Weed management in major field and horticultural crops and in non cropped areas. Shift in weed flora in cropping systems. Classification, useful and harmful aspects and control measures of aquatic weeds. Problematic weeds and their control.

Practical:

Identification of weeds and weed seeds. Survey of weeds in crop fields and other habitats. Preparation of weed herbarium. Computation of herbicide doses, weed control efficiency and weed index. Methods of recording weed intensity under different situations. Herbicide label information of commonly available herbicides. Herbicide application equipments and their calibration. Diagnosis of herbicide toxicity symptoms in different crops and weeds. Visits to problem areas.

B.Sc. Agriculture (Hons.)

AGR-412 Crop Production under Special Situations

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Internal Assessment: 20
Periods per Week 4+0

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Dry Farming: extent, and problems. Distribution of low rainfall areas. Effect of moisture stress on physiological processes. Plant water relationships, special characteristics of plants, seed treatments, water conservation characteristics, fertilizer management, mixed cropping, crop and variety selection, crop sequences, use of mulches and chemicals to save water and crop diversification in dry farming. Contingency crop planning for aberrant weather conditions. Problematic soils, crop management problems of water logged, saline, alkali soils; agronomic practices with special reference to crop rotations, planting techniques, irrigation management, weed control and fertilizer use in problematic soils. Raising fodders- Role of fodder crops and pastures in farm economy, raising of different fodders, fodder quality, fodder preservation and factors affecting quality of preserved fodder, silage and hay making.

Plant nutrients-, functions, deficiency symptoms, content and distribution in soils, nutrient transformations, retention and availability, nutrient interactions. Methods of soil fertility evaluation, fertilizers and their fate in soil, crop response to fertilizers, fertilizer use efficiency, time and mode of fertilizer application. Concept of integrated fertilizer use and water management in soil. Nutrient removal by crops, maintenance of soil fertility. Current fertilizer consumptions, future trends and needs.

B.Sc. Agriculture (Hons.)

SSC-413 Analytical Techniques in Soils, Plants, Fertilizers and Water

Time: 3 Hours **Max. Marks: 150**
Theory: 80
Practical: 40
Internal Assessment: 30
Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Colorimetric and flame photometric methods. Atomic absorption spectrophotometery. Cation and anion exchange phenomenon and their importance. Ion adsorption, desorption and fixation in soils. Methods ofsoil fertility evaluation. Fertilizer control order. Acid, saline, sodic, calcareous soils and their amelioration. Planning and formulation of project on establishment of soil water and plant testing laboratory. Practical: Preparation of standard solutions. Collection of soil, water, plant and fertilizer samples. Analysis of soil samples for fertility and quality evaluation for field crops and orchard plantations. Analysis of irrigation water for quality appraisal. Fertilizers analysis for quality control. Soil, water and fertilizer analysis reports for recommendation purposes. Analysis of forms of nitrogen , phosphorous, potassium and sulphur in soils. Determination of DTPA- extractable micronutrients. Plant analysis for total N, P, K andmicro-nutrients. Determination of CEC and AEC of soils. Nutrient adsorption and fixation capacities of soils.

B.Sc. Agriculture (Hons.)

FOR-414 Production Technology of Economic Forest Trees

Time: 3 Hours **Max. Marks: 150**
Theory: 80
Practical: 40
Internal Assessment: 30
Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Plantation silviculture: native versus exotics; even-aged versus uneven-aged; monoculture versus mixed culture. Plantation technology and tending operations of economically important tree species. Agro-forestry concept and suitable agro-forestry systems/models for different regions. Economic and ecological aspects of agro forestry systems. Importance of superior phenotypes, their evaluation and use implantations. Climate change and forests. Forest regeneration, productivity and rotation. Desertification and rehabilitation of waste lands. Short rotation intensive management of forest plantations. Trees outside forests, energy/industrial plantation and dendro- remediation. Production and marketing of forestry produce. Forest fire and its management. Wood based industries and importance of non-timber forest produce. Framework for forestry extension: participatory rural appraisal and joint-forest management.

Practical:

Nursery management: propagation methods, quality planting stock, preparation of nursery and plantation schedule. Layout and establishment of agro forestry models. Estimation of tree volume and biomass; enumeration and vegetation survey. Methods of vegetation analysis: measurement ofbiomass and productivity. Visit to commercial plantations, wood based industries and forestry institutes.

B.Sc. Agriculture (Hons.)

EXT-411 Communication and Information Technology

Time: 3 Hours **Max. Marks: 150**
Theory: 80
Practical: 40
Internal Assessment:30
Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Introduction to communication. Problems in communication and feedback. Role of information and communication technology in agriculture and rural development. Extension teaching methods and their use. Trends in agriculture information management system. Need and scope of cyber extension. Importance of kiosks, agri- portal, internet café, community and FM radio in villages. Privatization of cyber extension. Public-private partnership. Development of Information Communication Technology (ICT) in changing the agricultural scenario.

Practical:

Studying problems faced by farmers at Agri-clinic and analyzing communication problems of extension personnel. Use of different extension teaching methods in field and simulated conditions. Practice in planning and conducting video- conferencing. Visit to information kiosks. Identifying problems in agriculture information management system.

B.Sc. Agriculture (Hons.)

MGT-412 **Financial and Project Management**

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment: 30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Importance, need, scope and functions of finance. Concept of time value of money. Capital budgeting concept and steps in capital budgeting, appraisal criteria- payback period, average rate of return, net present value, benefit cost ratio and internal rate of return. Working Capital Management- concept, determinants and need for working capital in agribusiness. Introduction, objectives and techniques of inventory management for agribusiness. Introduction to cost of capital and capital structure. Project management- concept, characteristics and types of projects. Project feasibility- market, technical, financial and economic feasibility. Project risk analysis. Estimating financial requirements of projects and sources of finance.

Practical:

Case studies related to financial management and project management. Visits to agri-business industrial houses. Numerical problems based on capital budgeting. Preparation of project report for various agri-business ventures.

B.Sc. Agriculture (Hons.)

EXT-413 Behavioral Skills for Human Resource Development

Time: 3 Hours **Max. Marks: 100**

Theory: 80

Internal Assessment: 20

Periods per Week 4+0

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Concept of human behavior. Taxonomy of behavioral domains. Human needs and their hierarchy. Attitude, its characteristics and measurement. Perception and its principles, selectivity in perception. Motivational skills for attitudinal and perceptional changes. Problem-solving skills. Innovativeness in human behavior, response and resistance to change. Concept of self, Johari's window model. Defense mechanism. Group dynamics. Group behavior and conflict management. Decision-making process. Theories of leadership. Concept of human resource development and human relations. Human interaction, its importance and types. Interpersonal perception and social behavior.

B.Sc. Agriculture (Hons.)

AGE-414 **Micro Economic Analysis**

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment:30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Micro Economics: meaning, definition, importance, nature and scope. Theory of consumer behavior: marginal utility analysis and indifference curve analysis. Demand analysis: meaning, definition, derivation of demand curve. Firm and industry: meaning, types, difference between firm and industry, equilibrium conditions, short-run and long-run analysis. Production: meaning, process and factors of production, relationship between production and different factors, production lags. Theory of producer behavior production function, costs, optimization of inputs use and product combinations, maximization of returns, specialization and diversification and supply analysis. Product market: meaning, types, assumptions, conditions of perfect and imperfect markets. Equilibrium of a firm and industry, determination of price and output of commodities under different market situations. Factor pricing: meaning, different theories for determination of rent, wages, interest and profit.

Practical:

Practical training to study consumer behavior in relation to demand of various commodities, consumer survey. Economic analysis of a firm and industry. Working knowledge of relationship between production and different factors of production, production costs and optimum input use. Product market survey. Practical training of price determination in different types of markets.

B.Sc. Agriculture (Hons.)

ENT-411 **Apiculture**

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment:30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Indian history of beekeeping. Species and races of honey bees. Morphology and anatomy of honey bee. Colony organization, life cycle and division of labour in Apis mellifera. Seasonal management of honey bee colonies; swarming, drifting and curbing drone population. Management of queenless and laying worker colonies. Colony multiplication. Bee enemies and diseases. Protection from pesticidal hazards. Maximizing honey production. Bee flora. Managed bee pollination of crops. Colony migration. Apicultural diversification. Honey and its quality. Economics of beekeeping.

Practical:

Important species of honey bees, castes differentiation and body structure. Handling of colonies. Colony organization and food storage pattern. Langstroth hive, apicultural equipment and machinery. Bee flora. Seasonal management practices. Colony division. Mass queen bee rearing techniques. Queen introduction, clipping and marking. Bee pollination of crops. Management of bacterial, viral and fungal diseases of honey bees. Identification and management of parasitic mites, wax moths, ants, wasps and predatory birds. Honey extraction. Pollen, propolis and bee venom collection. Processing of bees wax. Royal jelly production and collection. Honey processing and packaging. Honey testing. Visit to beekeeping industry (Hive manufacturing, equipment manufacturing, honey processing and exporting commercial units).

B.Sc. Agriculture (Hons.)

PPL-412 Post Harvest Diseases and their Management

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment: 30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Importance of post-harvest diseases. Important post-harvest diseases of fruits and vegetables. Factors affecting ripening of fruits and vegetables. Factors favoring development of post-harvest diseases. Effect of handling and storage practices on the development of post-harvest diseases. Storage methods and conditions. Disease management strategies for post-harvest diseases.

Practical:

Important post-harvest diseases of fruits and vegetables like mango, citrus, guava, grapes, pear, cucurbits, chilli, tomato and potato. Study of factors favouring development of post-harvest diseases. Disease development under different storage conditions. Demonstration of various methods of disease management. Visit to a packing house.

B.Sc. Agriculture (Hons.)

ENT-413 **Quarantine in Plant Protection**

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Internal Assessment: 20
Periods per Week 4+0

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

UNIT I

Definition of pest, pesticides and transgenics as per Govt. notification; relative importance; quarantine – domestic and international. Quarantine restrictions in the movement of agricultural produce, seeds and planting material; case histories of exotic pests/diseases and their status.

UNIT II

Plant protection organization in India. Acts related to registration of pesticides and transgenics. History of quarantine legislations, PQ Order 2003. Environmental Acts, Industrial registration; APEDA, Import and Export of bio-control agents.

UNIT III

Identification of pest/disease free areas; contamination of food with toxigens, microorganisms and their elimination; Symptomatic diagnosis and other techniques to detect pest/pathogen infestations; VHT and other safer techniques of disinfestation/salvaging of infected material.

UNIT IV

WTO regulations; non-tariff barriers; Pest risk analysis, good laboratory practices for pesticide laboratories; pesticide industry; Sanitary and Phytosanitary measures.

B.Sc. Agriculture (Hons.)

NEM-414 **Plant Nematology**

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment: 30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

- History and economic importance of plant parasitic nematodes.
- General characteristics, identification and their classification.
- Relationship with other organisms **(Biotic associations with fungus, bacteria, Rhizobium, arthropods and vertebrates)**
- Morphology and biology of important genera, namely Meloidogyne, Heterodera, Globodera, Anguina, Rotylenchulus, Ditylenchus, Tylenchulus, Pratylenchus, Radopholus and virus vectors.
- **Influence of microorganisms on plant nematode interactions. (Interaction of plant nematodes with microorganisms)**
- **Types of parasitism; nature of damage and general symptomatology**
- Principles and methods of nematode control.
- **Application of biotechnological approaches in Nematode management.**
- **Integrated nematode management**
- **Beneficial nematodes (In brief)**

Practical:

Methods of survey, collection of soil and plant samples. Extraction of nematodes and population estimation. Preparation of temporary and permanent mounts. Study of morphological characteristics and disease symptoms. Application of nematicides.

B.Sc. Agriculture (Hons.)

TPR **Training Project Report**

Max. Marks: 150

Training components and schedule…..

Students required to submit a report w.r.t their training duly assigned by their training and teacher incharge

B.Sc. Agriculture (Hons.)

FSC-421 Commercial Fruit Production

Time: 3 Hours **Max. Marks: 150**
Theory: 80
Practical: 40
Internal Assessment: 30
Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Importance and uses, botany, flowering and fruiting, climate and soil, promising varieties, horti- agri techniques, production, plant protection measures and special problems in fruits such as citrus, mango, guava, apple, pear, peach, plum, ber, litchi, grapes, pomegranate, papaya, pineapple, phalsa, banana and sapota.

Practical:

Identification of species and fruit varieties, training and pruning, maturity standards, harvesting, handling, grading and packing of fruits. Project formulation and valuation of orchard management.

B.Sc. Agriculture (Hons.)

FSC-422 Processing and Value Addition of Horticultural Crops

Time: 3 Hours **Max. Marks: 100**
Theory: 60
Practical: 20
Internal Assessment: 20
Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Scope of fruit preservation industry in India, present status, constraints and prospects. Importance, principles and practices of fruit processing. Maturity indices, harvesting, transportation and quality parameters of fruits. Pre and post harvest factors affecting processing quality of fruits. Commercial processing technologies for fruits like mango, citrus, guava, grapes, ber, apple, pear, peach, plum, phalsa, litchi, pomegranate and papaya etc. Packing technology for export and value addition.

Practical:

Judging of maturity of different fruits. Methods of preparation of jam, jelly, ready to serve, squash, nectar, canning, chutney, pickle and marmalade etc. Packing technologies. Drying and dehydration of fruits. Visit to local processing unit.

B.Sc. Agriculture (Hons.)

VSC-423 Forcing Techniques in Vegetable Production

Time: 3 Hours **Max. Marks: 100**

Theory: 60

Practical: 20

Internal Assessment: 20

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Objectives, importance and scope of protected cultivation. Nursery raising techniques. Environmental factors. Vegetable growing media. Irrigation and fertigation. Sustainable land use systems. Maximizing and use efficiency i-protected structures. Problems of growing vegetables in protected structures,. Soil sterilization techniques. Hydroponics cultivation. . Pest management in green house/glass house. Crops and varieties suitable for protected cultivation. Specific technology for raising tomato, sweet pepper, cucumber and high value crops in off season. Cladding material for protected structures -use of mulches. Seed production of vegetables.

Practical: **Time: 3 Hours**

Study of various types of structures. Methods to control temperature, CO2, light. Demonstration for sanitation measures. Hydroponics. Maintenance of parental lines and hybrid seed production in glasshouse. Fertigation and nutrient management. Control of diseases and insect pests in glasshouse. Visit to established greenhouses in the region.

B.Sc. Agriculture (Hons.)

FCL-424 Commercial Floriculture and Landscaping

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment: 30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Scope, importance and export potential of floriculture, environment factors influencing plant growth and flower production in cut flowers. Production technology including varieties, propagation, soil, nutrition, disease and pests of important cut flowers. Post harvest handling, grading and packing cupflowers, pot and bedding plants. Flower seed production. History of gardening, characteristics of Hindu, Mughal, Japanese and English gardens. Principle groups of plants like trees, shrubs, climbers, shade loving plants, ground covers, their analysis and use in landscape composition. Principles of art and landscaping. Preparation of landscape plans for homes, farm complexes, small parks and institutions. Development and maintenance of rock, water and terrace gardens. Bonsai and dish gardens, project formulation and evaluation.

Practical:

Preparation of plans and laying out of gardens. Identification of planting material and commercial varieties of flowers. Seed collection, germination tests and storage. Harvesting and handling of cut flowers. Judging of flowers and pot plants. Visit to local nurseries and florist centers.

B.Sc. Agriculture (Hons.)

AGR-421 Farming Systems and Sustainable Agriculture

Time: 3 Hours **Max. Marks: 150**
Theory: 80
Practical: 40
Internal Assessment: 30
Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Farming systems, definition, principles and components. Farming System models for irrigated, dryland situations and modules for marginal, small and large farmers. Farming systems of the world-arable, pastoral, lay farming, shifting cultivation, ranching and agro-forestry systems. Energy and fuel wood plantations. Specialized and diversified farming, family co-operative and collective farming: their occurrence, adaptations and weaknesses. Factors affecting choice of farming systems. Cropping systems, their characteristics and management. Cropping patterns. Agro-ecosystem and agro-ecological zones of India. Efficient food producing systems. Sustainable agriculture- Introduction, definition, goal and current concepts, factors affecting ecological balance and ameliorative measures, land degradation and conservation of natural resources.

Practical:

Preparation of cropping scheme and integrated farming system models for irrigated and dry land situations. Preparation of enriched Farm Yard Manure and Vermicompost. Visit to urban waste recycling unit, organic farm and model farmers' field. Preparation of farm lay out plans, different intensity crop rotations and cropping schemes. Estimating crop yields. Energy budgeting in different crops and cropping systems. Working out ecological optimum crop zones. Project making exercises for establishment of crop production farms under different situation.

B.Sc. Agriculture (Hons.)

SSC-422 Soil Physical and Biological Environment

Time: 3 Hours **Max. Marks: 150**
Theory: 80
Practical: 40
Internal Assessment: 30
Periods per Week 4+6

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Soil physical properties in relation to crop production. Soil thermal regime and its management. Soil air-composition, renewal, characterization of soil aeration in relation to plant growth. Movement of water in soil. Infiltration and redistribution of water in soil. Evaporation from soils and its management. Runoff from the agricultural fields and factors affecting. Soil organisms and their distribution, ecology, classification and activities in soil. Microbiological transformations of C, N and S in soils.

Practical:

Determination of dry and wet stability of aggregates. Measurement of in situ soil bulk density and filling of soil columns with a particular bulk density. Measurement of soil porosity. Determination of consistency limits of soils. Soil moisture characteristics. Measurement of soil temperature using thermocouples. Determination of infiltration rate under different surface conditions. In situ measurement of soil moisture by neutron probe and Time Domain Reflectrometry. In situ measurement of soil matric potentialusing tensiometers. Enumeration of soil bacteria, fungi and actinomycetes. Isolation of Rhizobiumand Azotobacter and measurement of respiration rate.

B.Sc. Agriculture (Hons.)

SSC-423 Soil Survey, Classification and Mapping

Time: 3 Hours **Max. Marks: 50**
Practical: 40
Internal Assessment: 10
Periods per Week 0+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Practical:

Application and use of global positioning system for soil survey. Macro-morphological study of soils. Classification of soils developed on different landforms. Study of base maps-cadastral maps, top sheets, aerial photographs and satellite imageries. Soil survey of project area-preparation of base maps, analysis of soil characteristics, classification of surveyed soils, mapping and report writing. Interpretation of soil survey data for land capability and crop suitability classifications. Use of geographical information system for preparing thematic maps

B.Sc. Agriculture (Hons.)

AGR-424 Production Technology of Spices, Aromatic, Medicinal and Plantation Crops

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment: 30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Important Spice crops- Ginger, Turmeric, Dill Seed, Pepper, Cardamom, Coriander, Cumin, Fennel, Celery and Fenugreek. Aromatic crops- Mentha, Lemongrass, Citronella, Palmarosa, Vetiver and Geranium. Medicinal plants- Discordia, Rauvolfia, Opium, Periwinkle, Guggal, Belladonna, Nuxvomica, Solanumnigrum, Senna, Amla, Isabgol, Coleus, Acorus and Pipli (mug); Plantation crops- Coconut, Areca nut, Betel vine, Cashew, Cocoa and Coffee with special reference to their origin and distribution, adaptation, classification, growth and development in relation to environment, climatic requirements, varieties, agronomic practices for sustained production, harvesting, processing marketing and quality aspects and uses.

Practical:

Identification of crops based on morphological and seed characteristics. Propagation, seed selection, seed treatment, processing and distillation techniques for different medicinal, aromatic and spice crops.

B.Sc. Agriculture (Hons.)

MGT-421 Retailing and Supply Chain Management

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Internal Assessment: 20
Periods per Week 4+0

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Introduction to retailing- definition, concept and overview. Types of retail institutions related to agri- business. Changing food consumption patterns in India. Store location and site selection. Managing retail operations procurement and inventory management. Promoting store. Introduction to customer relationship management in retail business. Supply chain management concept, definition and importance. Elements of physical distribution systems, building and operating supply chains in agribusiness. Role of IT in supply chain management. Customers buying behavior including the buying process, purchasing the merchandise or service, post purchase evaluating types of buying decisions.

B.Sc. Agriculture (Hons.)

AGE-422 **Macro Economic Analysis**

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Internal Assessment: 20
Periods per Week 4+0

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Macro Economics: meaning, definition, importance, limitations, scope and integration of micro and macro analysis. Basic macroeconomic concepts. National income: meaning, definition, types, measurement and social accounting. Circular flow of money. Simple Keynesian model of income determination, shifts in aggregate demand. Multiplier. Theories of consumption and investment. Income determination model including money and interest. Monetary policy: meaning, instruments, indicators, lags and effectiveness. Fiscal policy: meaning, definition, different tools and limitations. Wage and employment policies: meaning, need, demand and supply of labor, measures of full employment, relationship between level of employment and output. Inflation and recession: process, causes, types and remedies.

B.Sc. Agriculture (Hons.)

AGE-423 Economic problems of Agriculture in India

Time: 3 Hours **Max. Marks: 150**
Theory: 80
Practical: 40
Internal Assessment: 20+10=30
Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Trends in agriculture production &productivity. Deceleration of agriculture growth rates in India, causes and effective measures to check it. Land reforms: Objectives, Measures, Achievements and shortcomings. Cooperative forming-Meaning objectives, types, merits & demerits, success and failure of cooperative sector in India. Rural indebtness: causes, effects, government measure to control it. Recommendations of Dr. Radha Krishnan's and RBI report on indebtness. Rural poverty; measurement and poverty alleviation programmes. Agriculture labor in India problems and remedies. Agricultural taxation: case for agricultural taxation, case for special treatment.

Practical:

Visit to wholesale & retail Mandis to study Marketing methods and practices with respect to major Agriculture commodities, Preparation of report, Visit to market committee to know the facilities provided to the farmers, various market charges paid by farmers & buyers, Preparation of family budget of two farmers, Tabulation of information to show the major items of expenses, food & clothing habits, housing & other facilities, Preparation of report.

B.Sc. Agriculture (Hons.)

EXT-424 **Visual and Graphic Communication**

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment: 30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Definition, characteristics, classification, principles and role of visuals in communication. Contribution of visual perception in learning process. Planning, preparation, presentation and evaluation of visual aids, low-cost visuals, photographs and pictures. Computer based digitized visual materials. Use of drawing techniques for visuals. Selection and use of animation tools in transfer of technology. Preparation and use of resource map for extension work. Designing of visuals for print and electronic media. Scope and importance of journalism in agriculture.

Practical:

Preparation and use of visual aids. Generating computer aided presentation of graphics. Scanning of visuals, image editing and script writing for radio & TV. Developing agricultural video films. Visit to animation, print and electronic media centers. Writing of news items, articles, success stories etc. for print and electronic media. Presentation and evaluation of visuals.

B.Sc. Agriculture (Hons.)

PPL- 421 Biocontrol and Integrated Disease Management

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment: 30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

History and principles underlying host resistance, chemical, physical, cultural, biological and legislative measures of plant disease management. Scope and factors affecting biological control. Mechanisms of bio-control. Characterization of bioagents and their commercial formulations. Limitations of biocontrol. Commercial production and distribution system. Integrated disease management. Historical developments and classification of fungicides and antibiotics. Mode of action, uptake , translocation, disease control and factors affecting their efficacy and field performance. Registration, commercial development and compatibility of fungicides with other chemicals. General account of plant protection appliances. Development of resistance in pathogens against fungicides .Non-target effects of fungicide use. Methods of screening for disease resistance. Seed certification standards and phytosanitory measures.

Practical:

Isolation and Identification of bio-control agents. Evaluation of bio-control agents against plant pathogens in vitro and in vivo. Production and application procedures. Laboratory evaluation of fungicides and antibiotics by various methods against different groups of pathogens. Methods of application of fungitoxicants. Absorption, translocation and persistence of different fungitoxicants. Integration of bio-control agents with other methods of plant disease control.

B.Sc. Agriculture (Hons.)

ENT-422 Biocontrol and Integrated Pest Management

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessmen30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

History and concept of biological control, different groups of biological control agents and biopesticidesmacrobials (parasitoids and predators), microbials (bacteria, viruses, fungi, protozoa and nematodes) and botanical- neem, pyrethrum, nicotine, rotenone and others, their use in pest management along with advantages and limitations. Methods of mass production for each of these groups. National and international agencies dealing with biological control. IPM-history, definition and concept. Concept of economic threshold. Pest monitoring and surveillance. Different tools of IPM including physical, mechanical, cultural, biological (parasite and predators, microbial agents), host plant resistance, botanical, chemical, biorationals and biotechnological approaches. Integration of different IPM tactics. Decision making systems. Potential of IPM, its implementation and constraints. Successful example in IPM.

Practical:

Identification of important groups of parasitoids, predators and microbial control agents. Laboratory multiplication of parasitoids, predators and microbial control agents. Determination of economic threshold levels. Demonstration of cultural and mechanical control measures of different pests. Use of pheromones, colour, sticky and light traps for monitoring and surveillance of pests. Study of IPM module in cotton, rice, sugarcane, maize, fruits and vegetables

B.Sc. Agriculture (Hons.)

ENT-423 Pesticides and Plant Protection Equipment

Time: 3 Hours **Max. Marks: 150**

Theory: 80

Practical: 40

Internal Assessment: 30

Periods per Week 4+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Theory:

Pesticides- classification, properties, entry and mode of action. Formulations and toxicity of pesticides. Factors affecting toxicity of pesticides.Compatibility and synergism. Antidotes. Problems associated with the use of pesticides. Role of repellents, attractants, pheromones, hormones, chemosterilants and antifeedants in pest control. Pest control equipment - history of development, classification, constructional features, principles of working, operation, maintenance and selection. Planning of pest control operations.

Practical:

Familiarization with different formulations of pesticides, their preparation and use. Toxicity to insects and plants. Calculation of dosages of pesticides and fumigants. Practice in the use of various types of pest-control equipments. Study of factors affecting efficacy of pesticide spray. Calibrations of plant protection equipments. Common troubles in the use of pest-control equipment and their remedies. Estimation of pesticide residue in food commodities.

B.Sc. Agriculture (Hons.)

PPL-424 **Plant Disease Diagnosis**

Time: 3 Hours **Max. Marks: 50**
Practical: 40
Internal Assessment: 10
Periods per Week 0+6

Instructions for the paper setters

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. Not more than one question should be based on one topic.
4. The question paper should cover the whole syllabus and questions should be evenly distributed.
5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Practical:

Field diagnosis of important diseases of Rabi and Kharif crops, vegetables, fruits , forest and ornamental plants. Estimation of losses and methods for assessing the intensity of diseases like angular leaf spot of cotton, Tikka disease of groundnut, yellow mosaic of beans , downy mildew of bajra, rusts and loose smut of wheat, Alternaria blight, downy mildew of mustard and powdery mildew of pea. Methods of soil sterilization for raising healthy nursery plants. Solar-heat treatment. Methods of producing virus-free citrus and potato. Diagnosis and differentiation of disorders due to viruses, nutritional imbalances, genetic variations and toxaemias. Types of chemicals used for the control of plant diseases and methods of their application. Cultural and biological methods of plant disease control.

B.Sc. Agriculture (Hons.)

TPR **Training Project Report**

Max. Marks: 150

Training components and schedule…..

Students required to submit a report w.r.t their training duly assigned by their training and teacher incharge

.