FACULTY OF AGRICULTURE

SYLLABUS

For

B.Sc. AGRICULTURE (Hons.)

(Semester: I–VIII)

Session: 2017-18

KHALSA COLLEGE AMRITSAR-143001

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

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th	Prac	Th	Prac	Th	Prac	Th	Prac	
1.	AGR-111	Fundamentals of Agronomy	4	3	40	20	10	05	50	25	**75**
2.	AGM-112	Introductory Agrometeorology and Climate Change	4	3	40	20	10	05	50	25	**75**
3.	MBL- 113	Agricultural Microbiology	4	3	40	20	10	05	50	25	**75**
4.	SSC-114	Fundamentals of Soil Science	4	3	40	20	10	05	50	25	**75**
5.	AGE-115	Fundamentals of Agricultural Economics	4	0	40		10		50	--	**50**
6.	EXT-116	Rural Sociology and Educational Psychology	4		40		10		50		**50**
7.	BIT-117	Fundamentals of Biotechnology	4	3	40	20	10	05	50	25	**75**
8.	BOT-118 MAT-118	Introductory Biology/ Elementary Mathematics	2 4	3 0	20 40	20 -	05 10	05 -	25 50	25 --	**50** **50**
9.	ENG-119	Communication Skill in English	6	0	40	0	10	0	50	0	**50**
10.	GPB-120/ BPB-120	Punjabi (Compulsory) / Basic Punjabi (Mudhli Punjabi)	6	0	40	-	10	-	50	--	**50**
11.	SOA-101	*Drug Abuse: Problem, Management and Prevention (Compulsory)	3								**NC**
		Total	**39/41**	**21/18**							**650**

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

B.Sc. Agriculture (Hons.)

SEMESTER-II

Sr. No	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Prac.	Th.	Prac.	Th.	Prac.	Th.	Prac.	
1.	FSC-121	Fundamentals of Horticulture	4	3	40	20	10	5	50	25	**75**
2.	BCH-122	Fundamentals of Plant Biochemistry	4	3	40	20	10	5	50	25	**75**
3.	FOR-123	Introduction to Forestry	4	3	40	20	10	5	50	25	**75**
4.	BOT-124	Fundamentals of Crop Physiology	4	3	40	20	10	5	50	25	**75**
5.	PBG-125	Fundamentals of Genetics	4	3	40	20	10	5	50	25	**75**
6.	EXT-126	Fundamentals of Agricultural Extension Education	4	3	40	20	10	5	50	25	**75**
7.	ENT-127	Fundamentals of Entomology-I	4	3	40	20	10	5	50	25	**75**
8.	ENG-128	Communication Skill in English-II	6	0	40	0	10	0	50	0	**50**
9.	GPB-129 /BPB-129	Punjabi (Compulsory) / Basic Punjabi (Mudhli Punjabi)	6		40		10		50	--	**50**
10.	AGH-130	Agriculture Heritage	2		20		5		25		**25**
11.	SOA-101	*Drug Abuse: Problem, Management and Prevention (Compulsory)	3								**NC**
		TOTAL	**40**	**24**	**380**	**140**	**95**	**35**	**450**	**175**	**675**

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

B.Sc. Agriculture (Hons.)

SEMESTER-III

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Prac.	Th.	Prac.	Th.	Prac.	Th.	Prac.	
1.	AGR-211	Crop Production Technology- I (Kharif Crops)	4	3	40	20	10	05	50	25	75
2.	PBG-212	Fundamentals of Plant Breeding	4	3	40	20	10	05	50	25	75
3.	AGR-213	Farming System and Sustainable Agriculture	4	0	40	00	10	00	50	00	50
4.	STA-214	Stastistical Methods	4	3	40	20	10	05	50	25	75
5.	AEN-215	Farm Machinery and Power	4	3	40	20	10	05	50	25	75
6.	AGE-216	Agricultural finance and Co-operation	4	3	40	20	10	05	50	25	75
7.	VSC-217	Production Technology for Vegetables and Spices	4	3	40	20	10	05	50	25	75
8.	FSC-218	Production Technology for Fruits and Plantation crops	4	3	40	20	10	05	50	25	75
9	ENT-219	Fundamentals of Entomology-II	4	3	40	20	10	05	50	25	75
10.	ESL-221*	Environmental Studies -I	2		40		10				50
	Total		**38**	**24**	**360**	**160**	**90**	**40**	**450**	**200**	**650**

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

B.Sc. Agriculture (Hons.)

SEMESTER-IV

Sr. No	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th	Prac	Th.	Prac	Th	Prac	Th.	Prac	
1.	AGR-221	Crop Production Technology -II (Rabi Crops)	4	3	40	20	10	05	50	25	75
2.	PBG-222	Principles of Seed Technology	4	3	40	20	10	05	50	25	75
3.	FSC-223	Production technology for Ornamental Crops, MAP and Landscaping	4	3	40	20	10	05	50	25	75
4.	AEN-224	Renewable Energy	4	3	40	20	10	05	50	25	75
5.	LPM-225	Livestock and Poultry Management	4	3	40	20	10	05	50	25	75
6.	PPL-226	Fundamentals of Plant Pathology	4	3	40	20	10	05	50	25	75
7.	AGI-227	Agriculture Informatics	4	3	40	20	10	05	50	25	75
8.	SSC- 228	Problamatic Soils and their Management	4	0	40	00	10	00	50	00	50
9.	AGE-229	Agricultural Marketing, Trade and Prices	4	3	40	20	10	05	50	25	75
10.	ESL-222*	Environmental Studies-II	2		40	-	10	-	50	-	50
	Total		**38**	**24**	**360**	**160**	**90**	**40**	**450**	**200**	**650**

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

B.Sc. Agriculture (Hons.)

SEMESTER-V

Sr. No.	Course	Subject	Period Per week		Marks		Internal Assessment		Total Marks		Grand Total
			Th.	Prt.	Th.	Prt.	Th.	Prt.	Th.	Prt.	
1.	AGR-311	Practical Crop Production-I *(Kharif Crops)*	0	3	0	20	0	05	0	25	25
2.	AGR-312	Water Management and Micro Irrigation	4	3	40	20	10	05	50	25	75
3.	CHE-313	Chemistry of Agrochemicals, Plant Products and Growth Regulators	2	3	20	20	05	05	25	25	50
4.	AGE-314	Agricultural Marketing, Trade and Prices	4	3	40	20	10	05	50	25	75
5.	PPL-315	Plant Pathogens and Principles of Plant Pathology	4	3	40	20	10	05	50	25	75
6.	ENT-316	Insect Pests of Crops and stored Grain	4	3	40	20	10	05	50	25	75
7.	PBG-317	Principles of Plant Breeding	4	3	40	20	10	05	50	25	75
8.	BIT-318	Principles of Plant Biotechnology	4	3	40	20	10	05	50	25	75
9.	DAI-319	Dairy Technology	4	3	40	20	10	05	50	25	75
	Total		**30**	**27**	**300**	**180**	**75**	**45**	**375**	**225**	**600**

B.Sc. Agriculture (Hons.)

SEMESTER-VI

Sr. No.	Course	Subject	Period Per week		Marks		Internal Assessment		Total Marks		Grand Total
			Th.	Prt.	Th.	Prt.	Th.	Prt.	Th.	Prt.	
1.	AGR-321	Practical Crop Production-II *(Rabi Crops)*	0	3	0	20	0	05	0	25	25
2.	EST-322	Renewable Energy	4	3	40	20	10	05	50	25	75
3.	STA-323	Basic Statistics	4	3	40	20	10	05	50	25	75
4.	AGE-324	Production Economics, Farm Management and Agricultural Finance	4	3	40	20	10	05	50	25	75
5.	PPL-325	Diseases of Field Crops and their Management	4	3	40	20	10	05	50	25	75
6.	PPL-326	Diseases of Horticultural Crops and Their Management	4	3	40	20	10	05	50	25	75
7.	PBG-327	Breading of Field and Horticulture Crops	4	3	40	20	10	05	50	25	75
8.	PFE-328	Protected Cultivation and Post Harvest Technology	4	3	40	20	10	05	50	25	75
	Total		**28**	**24**	**280**	**160**	**70**	**40**	**350**	**200**	**550**

B.Sc. AGRICULTURE (HONS.)

SEMESTER VII

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Pract	Th.	Pract	Th.	Pract.	Th.	Pract.	
1.	FSC-411	Nursery Management of Horticultural Crops	4	3	80	40	20	10	100	50	150
2.	FSC-412	Fundamentals of Fruit Production	4	3	60	20	15	05	75	25	100
3.	VSC-413	Commercial Vegetable Production	4	6	80	40	20	10	100	50	150
4.	VSC-414	Vegetable Breeding and Seed Production	4	6	80	40	20	10	100	50	150
5.		Training Project Report (TPR)									150
		Total	**16**	**18**	**320**	**120**	**80**	**30**	**400**	**150**	**700**

B.Sc. AGRICULTURE (HONS.)

SEMESTER VII

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Pract	Th.	Pract.	Th.	Pract.	Th.	Pract.	
1.	AGR 411	Weed Management	4	6	80	40	20	10	100	50	150
2.	AGR-412	Crop Production under Special Situations	4	-	80		20		100		100
3.	SSC-413	Analytical Techniques in Soils, Plants, Fertilizers and Water	4	6	80	40	20	10	100	50	150
4.	FOR-414	Production Technology of Economic Forest Trees	4	6	80	40	20	10	100	50	150
5.		Training Project Report (TPR)									150
		Total	**16**	**18**	**320**	**120**	**80**	**30**	**400**	**150**	**700**

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		Total Marks		Grand Total
			Th	Pract	Th	Pract	Th	Pract	Th	Pract	
1.	EXT-411	Communication and Information Technology	4	6	80	40	20	10	100	50	150
2.	MGT-412	Financial and Project Management	4	6	80	40	20	10	100	50	150
3	EXT-413	Behavioral Skills for Human Resource Development	4	0	80		20		100		100
4.	AGE-414	Micro Economic Analysis	4	6	80	40	20	10	100	50	150
5.		Training Project Report (TPR)									150
		Total	**16**	**18**	**320**	**120**	**80**	**30**	**400**	**150**	**700**

B.Sc. AGRICULTURE (HONS.)

SEMESTER VII

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

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Pract	Th.	Pract	Th.	Pract.	Th.	Pract.	
1.	ENT-411	Apiculture	4	6	80	40	20	10	100	50	150
2.	PPL-412	Post Harvest Diseases and their Management	4	6	80	40	20	10	100	50	150
3.	ENT-413	Quarantine in Plant Protection	4		80		20		100		100
4.	NEM-414	Plant Nematology	4	6	80	40	20	10	100	50	150
5.		Training Project Report (TPR)									150
		Total	**16**	**18**	**320**	**120**	**80**	**30**	**400**	**150**	**700**

B.Sc. AGRICULTURE (HONS.)

SEMESTER VIII

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Pract	Th	Pract	Th.	Pract	Th.	Pract	
1.	FSC-421	Commercial Fruit Production	4	6	80	40	20	10	100	50	150
2.	FSC-422	Processing and Value Addition of Horticultural Crops	4	6	60	20	15	05	75	25	100
3.	VSC-423	Forcing Techniques in Vegetable Production	4	6	60	20	15	05	75	25	100
4.	FCL-424	Commercial Floriculture and Landscaping	4	6	80	40	20	10	100	50	150
5.		Training Project Report (TPR)								150	150
		Total	**16**	**24**	**280**	**120**	**70**	**30**	**350**	**300**	**650**

B.Sc. AGRICULTURE (HONS.)

SEMESTER VIII

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Pract	Th	Pract	Th	Pract.	Th.	Pract.	
1.	AGR-421	Farming Systems and Sustainable Agriculture	4	6	80	40	20	10	100	50	150
2.	SSC-422	Soil Physical and Biological Environment	4	6	80	40	20	10	100	50	150
3.	SSC-423	Soil Survey, Classification and Mapping	0	6		40		10		50	50
4	AGR-424	Production Technology of Spices, Aromatic, Medicinal and Plantation Crops	4	6	80	40	20	10	100	50	150
5.		Training Project Report (TPR)								150	150
		Total	**12**	**24**	**240**	**160**	**60**	**40**	**300**	**350**	**650**

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		Total Marks		Grand Total
			Th.	Pract	Th.	Pract	Th.	Pract.	Th.	Pract.	
1.	MGT-421	Retailing and Supply Chain Management	4	0	80		20		100		100
2.	AGE-422	Macro Economic Analysis	4	0	80		20		100		100
3.	AGE-423	Economic problems of Agriculture in India	4	6	80	40	20	10	100	50	150
4.	EXT-424	Visual and Graphic Communication	4	6	80	40	20	10	100	50	150
5.		Training Project Report (TPR)								150	150
		Total	**16**	**12**	**32**	**80**	**80**	**20**	**400**	**250**	**650**

B.Sc. AGRICULTURE (HONS.)

SEMESTER -VIII

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

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Pract	Th	Pract	Th	Pract.	Th.	Pract.	
1.	PPL-421	Biocontrol and Integrated Disease Management	4	6	80	40	20	10	100	50	150
2.	ENT-422	Biocontrol and Integrated Pest management	4	6	80	40	20	10	100	50	150
3.	ENT-423	Pesticides and Plant Protection Equipment	4	6	80	40	20	10	100	50	150
4	PPL-424	Plant Disease Diagnosis	0	6	-	40	-	10	-	50	50
5.		Training Project Report (TPR)								150	150
		Total	**12**	**24**	**240**	**160**	**60**	**40**	**300**	**350**	**650**

B.Sc. AGRICULTURE (HONS.)

SEMESTER-I

AGR-111: Fundamentals of Agronomy

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

Theory: 40

Practical: 20

Internal Assessment 10+5=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:

Agronomy and its scope, seeds and sowing, tillage and tilth, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency, water resources, soil plant water relationship, crop water requirement, water use efficiency, irrigation- scheduling criteria and methods, quality of irrigation water, water logging.

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

AGM-112: Introductory Agrometeorology & Climate Change

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

Theory: 40

Practical: 20

Internal Assessment 10+5=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:

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.)

MBL-113: Agricultural Microbiology

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

Theory: 40

Practical: 20

Internal Assessment 10+5=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. Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, chemoautotrophy, photo autotrophy, growth. Genetic recombination- transformation, conjugation and transduction, plasmids, transposon.

Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and sulphur cycles. Biological nitrogen fixation- symbiotic, associative and aysmbiotic. Azolla, blue green algae and mycorrhiza. Rhizosphere and phyllosphere. 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.)

SSC-114: **Fundamentals of Soil Science**

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

Theory: 40

Practical: 20

Internal Assessment 10+5=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:

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

AGE-115: Fundamentals of Agricultural Economics

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:

Economics: Meaning, scope and subject matter, definitions, activities, approaches to economic analysis; micro and macro economics, positive and normative analysis. Basic concepts: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare. Agricultural economics: meaning, definition, characteristics of agriculture, importance and its role in economic development. *Demand:* meaning, law of demand, 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. Elasticity of demand: concept and measurement of price elasticity, income elasticity and cross elasticity. Supply: Stock v/s supply, law of supply, 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. *National income:* Meaning and importance, circular flow, concepts of national income accounting and approaches to measurement, difficulties in measurement..

B.Sc. AGRICULTURE (HONS.)

EXT-116: Rural Sociology & Educational Psychology

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:

Sociology and Rural sociology: Definition and scope, its significance in agriculture extension, Rural society, Social Groups, Social Stratification, Culture concept, Social Institution, Social Change & Development. Educational psychology: Meaning & its importance in agricultureextension. Behavior: Cognitive, affective, psychomotor domain, Personality, Learning, Motivation, Theories of Motivation, Intelligence

B.Sc. AGRICULTURE (HONS.)

BIT-117: Fundamentals of Biotechnology

Time: 3 Hours **Max. Marks: 75**
Theory: 40
Practical: 20
Internal Assessment 10+5=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

Concepts and applications of plant biotechnology: Scope, organ culture, embryo culture, cell suspension culture, callus culture, anther 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.

Practicals

Sterilization techniques. Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium. Callus induction from various explants. Micro-propagation, hardening and acclimatization. Demonstration on isolation of DNA. Demonstration of gel electrophoresis techniques and DNA finger printing.

B.Sc. AGRICULTURE (HONS.)

BOT-118: Introductory Biology

Time: 3 Hours **Max. Marks: 50**
Theory: 20
Practical: 20
Internal Assessment 5+5=10
Periods per week 2+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 the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics. Binomial nomenclature and classification Cell and cell division. Morphology of flowing plants. Seed and seed germination. Plant systematic- viz; Brassicaceae, Fabaceae and Poaceae. Role of animals in agriculture.

Practical

Morphology of flowering plants – root, stem and leaf and their modifications. Inflorence, 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-118 **Elementary Mathematics**

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:

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. (Hons.) Agriculture

ENG-119 Communication Skill in English

Time: 3 Hours

Max. Marks: 50
Theory: 30
Presentation: 10
Internal Assessment:10
Periods per week: 6

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, Editorial 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 SIX skill-oriented questions from Reading and Writing Skills. Each question will carry 5 marks. The question 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. Writing technical report
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
vii. Conjuction Unit 113-120 (6x5=30)

Presentation:-

1. 10 Marks for presentation.
2. Topic for presentation will be based on the skills mentioned in syllabus.
3. The Examiner to be appointed by HOD from among the senior faculty.

B.Sc. (Hons.) Agriculture

GPB-120 **Punjabi (Compulsory)**

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

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਦੋ ਰੰਗ** (ਕਵਿਤਾ ਭਾਗ) (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋ ਅਤੇ ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, 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) **8 ਅੰਕ**
2. ਰੇਖਾ ਚਿਤਰ : ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਸ਼ਖ਼ਸੀਅਤ ਦੇ ਗੁਣ **8 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 **8 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

B.Sc. (Hons.) Agriculture

BPB-120 **Basic Punjabi**

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

Theory: 40

Internal Assessment 10

Periods per Week 6+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 **15 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 ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। **(5+5+5) 15 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. (Hons.) Agriculture

SEMESTER-II

FSC-121: Fundamentals of Horticulture

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

Theory: 40

Practical: 20

Internal Assessment 10+5=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:

Horticulture-Its definition and branches, importance and scope; Horticultural Classification; climate and soil for horticultural crops; Plant propagation-methods and propagating structures; principles of orchard establishment; Principles and methods of training and pruning, juvenility and flower bud differentiation; unfruitfulness; pollination, pollinizers and pollinators; fertilization and parthenocarpy; kitchen gardening; garden types and parts; lawn making; brief description about medicinal and aromatic plants; spices and condiments; Irrigation & fertilizers application-method and quantity.

Practical:

Identification of garden tools. Identification of horticultural crops. Preparation of seed bed/nursery bed. Practice of sexual and asexual methods of propagation. Layout and planting of orchard plants. Training and pruning of fruit trees. Transplanting and care of vegetable seedlings. Making of herbaceous and shrubbery borders. Preparation of potting mixture, potting and repotting. Fertilizer application in different crops. Visits to commercial nurseries/orchard.

B.Sc. (Hons.) Agriculture

BCH-122 Fundamentals of Plant Biochemistry

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

Theory: 40

Practical: 20

Internal Assessment 10+5=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 of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate: Importance and classification. Structures of Monosaccharides, Structure of Disaccharides and Polysaccharides. Lipid: Importance and classification; Structures and properties of fatty acids; storage lipids and membrane lipids. Proteins: Importance of proteins and classification; Structures, zwitterion nature of amino acids; Structural organization of proteins. Enzymes: General properties; Classification; Mechanism of action; Introduction to allosteric enzymes. Nucleic acids: Importance and classification; Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure. Metabolism of carbohydrates: Glycolysis, TCA cycle, Glyoxylate cycle, Electron transport chain. Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids.

Practical:.

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

B.Sc. (Hons.) Agriculture

FOR-123: Introduction to Forestry

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

Theory: 40

Practical: 20

Internal Assessment 10+5=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 – definitions of basic terms related to forestry, objectives of silviculture, forest classification, salient features of Indian Forest Policies. Forest regeneration, Natural regeneration - natural regeneration from seed and vegetative parts, coppicing, pollarding, root suckers; Artificial regeneration – objectives, choice between natural and artificial regeneration, essential preliminary considerations. Crown classification. Tending operations – weeding, cleaning, thinning – mechanical, ordinary, crown and advance thinning. Forest mensuration – objectives, diameter measurement, instruments used in diameter measurement; Non instrumental methods of height measurement - shadow and single pole method; Instrumental methods of height measurement - geometric and trigonometric principles, instruments used in height measurement; tree stem form, form factor, form quotient, measurement of volume of felled and standing trees, age determination of trees. Agroforestry – definitions, importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country, shifting cultivation, taungya, alley cropping, wind breaks and shelter belts, home gardens. Cultivation practices of two important fast growing tree species of the region.

Practical:

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

B.Sc. (Hons.) Agriculture

BOT-124 **Fundamentals of Crop Physiology**

Time: 3 Hours **Max. Marks: 75**
Theory: 40

Practical: 20
Internal Assessment 10+5=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 crop physiology and its importance in Agriculture; Plant cell: an Overview; Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology; Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms; Photosynthesis: Light and Dark reactions, Photorespiration, C3, C4 and CAM plants; Respiration: Glycolysis, TCA cycle and electron transport chain; 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. Photoperiodism and vernalisation, translocation of assimilates. Senecense and Abscission, fruit ripening and its hormonal regulation.

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, Rate of transpiration, photosynthesis, respiration, tissue test for mineral nutrients, estimation of relative water content, Measurement of photosynthetic CO_2 assimilation by Infra Red Gas Analyser (IRGA).

B.Sc. (Hons.) Agriculture

PBG-125 Fundamentals of Genetics

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

Theory: 40

Practical: 20

Internal Assessment10+5=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:

Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity, Cell division – mitosis, meiosis, Probability and Chi-square. Dominance relationships, gene interaction.

Multiple alleles, pleiotropism and pseudoalleles, Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and Numerical and its estimation, crossing over mechanisms, chromosome mapping. Structural and numerical changes in chromosome, Mutation, classification, Methods of inducing mutation & CIB technique, mutagenic agents and induction of mutation. Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Epistatic interactions with examples. Cytoplasmic inheritance. Genetic disorders,. 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. Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross, Experiments on epistatic interactions including test cross and back cross, Practice on mitotic and meiotic cell division, 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 structure.

B.Sc. (Hons.) Agriculture

EXT-126 Fundamentals of Agricultural Extension Education

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

Theory: 40

Practical: 20

Internal Assessment10+5=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:

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: 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: privatization extension, cyber extension/ e-extension, market-led extension, farmer-led extension, expert systems, etc.

Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Dev.-meaning, definition, concept & principles, Physiology 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: concept and models, capacity building of extension personnel; extension teaching methods: meaning, classification, individual, group and mass contact methods, media mix strategies; communication: meaning and definition; 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; A visit to village to understand the problems being encountered by the villagers/ farmers; visit to NGO and learning from their experience in rural development; understanding PRA techniques and their application in village development planning; exposure to mass media: visit to 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. (Hons.) Agriculture

ENT-127 Funduntamentals of Entomology-I

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

Theory: 40

Practical: 20

Internal Assessment 10+5=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 of Entomology in India. Factors for insect's abundance. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus. Structure of male and female genital organ. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive system, in insects. Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptor.

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, basic groups of present day insects with special emphasis to orders and families of Agricultural importance like **Orthoptera**: Acrididae, Tettigonidae, Gryllidae, Gryllotalpidae; **Dictyoptera**: Mantidae, Blattidae; **Odonata**; **Isoptera**: Termitidae; **Thysanoptera**: Thripidae; **Hemiptera**: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; **Neuroptera**: Chrysopidae; **Lepidoptera**: Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; **Coleoptera**: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; **Hymenoptera**: Tenthridinidae, Apidae. Trichogrammatidae, lchneumonidae, Braconidae, Chalcididae; **Diptera**: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae.

Practical:

Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Blister beetle; Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper);

Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance.

B.Sc. (Hons.) Agriculture

ENG-128 Communication Skill in English-II

Time: 3 Hours **Max. Marks: 50**
Theory: 40
Internal Assessment:10
Periods per week :6

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 SIX skill-oriented questions from Listening and Speaking Skills. Each question will carry 5 marks. The question 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. Write a press note on college activities.
xiii. Do as directed change of voice units 42-46

(6x5=30)

Presentation:-

4. 10 Marks for presentation.
5. Topic for presentation will be based on the skills mentioned in syllabus.
6. The Examiner is to be appointed by HOD from among the senior faculty.

B.Sc. (Hons.) Agriculture

GPB-129 **Punjabi (Compulsory)**

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

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਦੋ ਰੰਗ** (ਕਹਾਣੀ ਭਾਗ) (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋ ਅਤੇ ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
2. **ਪੰਜਾਬ ਦੇ ਮਹਾਨ ਕਲਾਕਾਰ** (ਬਲਵੰਤ ਗਾਰਗੀ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
   ਲੇਖ : ਸਤੀਸ਼ ਗੁਜਰਾਲ, ਗੁਰਚਰਨ ਸਿੰਘ, ਠਾਕੁਰ ਸਿੰਘ, ਬਲਰਾਜ ਸਾਹਨੀ, ਸੁਰਿੰਦਰ ਕੌਰ।
3. **ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ** : ਪਰਿਭਾਸ਼ਾ, ਮੁਢਲੇ ਸੰਕਲਪ।
4. **ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ**
5. **ਪੈਰ੍ਹਾ ਰਚਨਾ**
6. **ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ**
7. **ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ**

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਕਿਸੇ ਕਹਾਣੀ ਦਾ ਸਾਰ ਜਾਂ ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ (ਦੋ ਵਿਚੋਂ ਇਕ) **(8 ਅੰਕ)**
2. ਰੇਖਾ ਚਿਤਰ : ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਸ਼ਖ਼ਸੀਅਤ ਦੇ ਗੁਣ **(8 ਅੰਕ)**
   3-4. 3-4 ਨੰਬਰ ਉੱਤੇ ਦਿੱਤੀ ਵਿਆਕਰਣ ਦੇ ਆਧਾਰ ਤੇ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ **(8 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)**

B.Sc. (Hons.) Agriculture

BPB-129 **Basic Punjabi**

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

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ** : ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਣਿਕ ਸ਼ਬਦ **15 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 । 15 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 10 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਇਨ੍ਹਾਂ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 40+10 = 50 ਹਨ।

B.Sc. (Hons.) Agriculture

AGH-130 **Agriculture Heritage**

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

Theory: 20

Internal Assessment=5

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

Introduction of Indian agricultural heritage, status of farmers in society; advice by sages to kings on their duties towards farmers, soil management in ancient, medieval & pre-modern India and its relevance in modern day sustainable agriculture, heritage of crop & water management, plant growth and development & plant protection through vrikshayurveda and traditional knowledge. Heritage of medicinal plants and their relevance today, seed health in ancient & medieval history and its relevance to present day agriculture, description of Indian civilization and agriculture by travelers from China, Europe and United States, our journey in agriculture, green revolution and its impact and concerns, vision for the future.

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

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

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

Theory: 40

Practical: 20

Internal assessment 10+5=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:

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. (Hons.) Agriculture

PBG- 212: Fundamentals of Plant Breeding

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

Theory: 40

Practical: 20

Internal assessment 10+5=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 apomixes, self – incompatibility and male sterility- genetic consequences, cultivar options. Domestication, Acclimatization, introduction; Centre of origin/diversity, component 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. (Hons.) Agriculture

AGR- 213 Farming Systems and Sustainable Agriculture

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:

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. (Hons.) Agriculture

STA-214: Statistical Methods

Time: 3 Hours **Max. Marks: 75**
Theory: 40
Practical: 20
Internal assessment 10+5=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 Statistics and its Applications in Agriculture, Graphical Representation of Data, Measures of Central Tendency & Dispersion, Definition of Probability, Addition and Multiplication Theorem (without proof). Simple Problems Based on Probability. Binomial & Poisson Distributions, 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, Use of Random Number Tables for selection of Simple Random Sample.

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, Measures of Skewness & Kurtosis (Ungrouped Data). Moments, Measures of Skewness & Kurtosis (Grouped Data). 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 Variance Two Way Classification. Selection of random sample using Simple Random Sampling.

B.Sc. (Hons.) Agriculture

AEN-215 **Farm Machinery and Power**

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

Theory: 40

Practical: 20

Internal assessment 10+5=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:-

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. (Hons.) Agriculture

AGE-216: Agricultural Finance and Co-Operation

Time: 3 Hours **Max. Marks: 75**
Theory: 40
Practical: 20
Internal assessment 10+5=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.Recent development in agricultural credit.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. Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing.

Practical

Analysis of progress and performance of cooperatives using published data. Analysis of progress and performance of commercial banks and RRBs using published data. Visit to a commercial bank, cooperative bank and cooperative society to acquire firsthand knowledge of their management, schemes and procedures. 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.Techno-economic parameters for preparation of projects. Seminar on selected topics.

B.Sc. (Hons.) Agriculture

VSC-217: Production Technology for Vegetable and Spices

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

Theory: 40

Practical: 20

Internal assessment 10+5=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 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 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. (Hons.) Agriculture

FSC-218: Production Technology for Fruit and Plantation Crops

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

Theory: 40

Practical: 20

Internal assessment 10+5=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 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, Pests, diseases and physiological disorders of above fruit and plantation crops, Visit to commercial orchard.

B.Sc. (Hons.) Agriculture

ENT-219 **Fundamentals of Entomology-II**

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

Theory= 40

Practical = 20

Internal Assessment 10+5=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:

Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors– temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents. Effect of biotic factors – food competition, natural and environmental resistance. Concepts of Balance of life in nature, biotic potential and environmental resistance and causes for outbreak of pests in agro-ecosystem.

Pest surveillance and pest forecasting. Categories of pests. Host plant resistance, Cultural, Mechanical, Physical. Legislative. Biological (parasites, predators & transgenic plant pathogens such as bacteria, fungi and viruses) methods of control. Chemical control-importance, hazards and limitations. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Recent methods of pest control, repellents, antifeedants, hormones, attractants, gamma radiation and genetic control. Practices, scope and limitations of IPM. Insecticides Act 1968-Important provisions. Application techniques of spray fluids. Phytotoxicity of insecticides. Symptoms of poisoning, first aid and antidotes. Beneficial insects: parasites and predators used in pest control and their mass multiplication techniques. Important groups of microorganisms, bacteria, viruses and fungi used in pest control and their mass multiplication techniques. Important species of pollinators, weed killers and scavengers, their importance.

Practical:

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

B.Sc. (Hons.) Agriculture

ESL-221* **ENVIRONMENTAL STUDIES-I**

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

Theory: 40

Internal Assessment: 10

Periods per week 2+0

Section A (12 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying four marks. Answer to any of the question should not exceed two pages.

Section B (16 Marks): It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying eight marks. Answer to any of the question should not exceed four pages.

Section C (12 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.

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

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

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

Theory: 40

Practical: 20

Internal assessment 10+5=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:

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; other crops-potato,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. (Hons.) Agriculture

PBG-222 **Principles of Seed Technology**

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

Theory: 40

Practical: 20

Internal assessment 10+5=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:

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.

Practical

Seed production in major cereals: Wheat, Rice, Maize, Sorghum and Bajra. Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Fieldpea. Seed production in major oilseeds: Soybean, Rapeseed and Mustard. Seed production in vegetable crops. Seed sampling and testing: Physical purity, germination, viability, etc. Seed and seedling vigour test. Genetic purity test: Grow out test and electrophoresis. Seed certification: Procedure, Field inspection, Preparation of field inspection report. Visit to seed production farms, seed testing laboratories and seed processing plant.

B.Sc. (Hons.) Agriculture

B.Sc. (Hons.) Agriculture

FSC-223 Production Technology for Ornamental Crops, MAP and Landscaping

Time: 3 Hours **Max. Marks: 75**
Theory: 40
Practical: 20
Internal assessment 10+5=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 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 asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella,palmarosa, ocimum, rose, geranium, vetiver.

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. (Hons.) Agriculture

AEN-224 **Renewable Energy**

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

Theory: 40

Practical: 20

Internal assessment 10+5=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:

Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers, biogas, bioalcohol, biodiesel and biooil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic system and their application, introduction of wind energy and their application.

Practical

Familiarization with renewable energy gadgets. To study biogas plants, To study gasifier, To study the production process of biodiesel, To study briquetting machine, To study the production process of bio-fuels. Familiarization with different solar energy gadgets. To study solar photovoltaic system: solar light, solar pumping, solar fencing. To study solar cooker, To study solar drying system. To study solar distillation and solar pond.

B.Sc. (Hons.) Agriculture

LPM-225 Livestock and Poultry Management

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

Theory: 40

Practical: 20

Internal assessment 10+5=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

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. Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records. 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. Clean milk production, milking methods. 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. (Hons.) Agriculture

PPL-226: Fundamentals of Plant Pathology

Time: 3 Hours **Max. Marks: 75**
Theory: 40
Practical: 20
Internal assessment 10+5=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: 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. Pathogenesis.Cause and classification of plant diseases. Important plant pathogenic organisms, different groups**:** fungi, bacteria, fastidious vesicular 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.

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, architecture, multiplication and transmission.

Study of phanerogamic plant parasites.

Nematodes: General morphology and reproduction, classification, symptoms and nature of damage caused by plant nematodes (Heterodera, Meloidogyne, *Anguina* etc.)

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. Preparation of media, isolation and Koch's postulates. General study of different structures of fungi. Study of symptoms of various plant diseases. Study of representative fungal genera. Staining and identification of plant pathogenic bacteria. Transmission of plant viruses. Study of phanerogamic plant parasites.

Study of morphological features and identification of plant parasitic nematodes. Extraction of nematodes from soil.

Study of fungicides and their formulations. Methods of pesticide application and their safe use. Calculation of fungicide sprays concentrations**.**

B.Sc. (Hons.) Agriculture

AGI-227 **Agricultural Informatics**

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

Theory= 40

Practical = 20

Internal Assessment 10+5=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 Computers, Anatomy of Computers, Memory Concepts, Units of Memory, Operating System, definition and types, Applications of MS-Office for creating, Editing and Formatting a document, Data presentation, tabulation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, creating database, uses of DBMS in Agriculture, Internet and World Wide Web (WWW), Concepts and components.

Computer Programming, General Concepts, Introduction to Visual Basic, Java, Fortran, C/ C++, etc, concepts and standard input/output operations.

e-Agriculture, concepts, design and development. Application of innovative ways to use information and communication technologies (IT) in Agriculture. Computer Models in Agriculture: statistical, weather analysis and crop simulation models, concepts, structure, inputs-outputs files, limitation, advantages and application of models for understanding plant processes, sensitivity, verification, calibration and validation. IT application for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management, Smartphone mobile apps in Agriculture for farm advises, market price, postharvest management etc; Geospatial technology, concepts, techniques, components and uses for generating valuable agri-information. 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 and crop calendars 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, handling macros. MS-ACCESS:

Creating Database, preparing queries and reports, demonstration of Agri-information system. Introduction to World Wide Web (WWW) and its components. Introduction of programming languages such as Visual Basic, Java, Fortran, C, C++. Hands on practice on Crop Simulation Models (CSM), DSSAT/Crop-Info/CropSyst/ Wofost. Preparation of Inputs file for CSM and study of model outputs, computation of water and nutrient requirements of crop using CSM and IT tools. Use of smart phones and other devices in agro-advisory and dissemination of market information. Introduction of Geospatial Technology, for generating information important for Agriculture. Hands on practice on preparation of Decision Support System. Preparation of contingent crop planning.

B.Sc. (Hons.) Agriculture

SSC-228 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 Agroeco systems.

B.Sc. (Hons.) Agriculture

AGE-229 Agricultural Marketing, Trade and Prices

Time: 3 Hours **Max. Marks: 75**
Theory= 40
Practical=20
Internal Assessment :10+5=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, marketing mix and market segmentation, 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; pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits; marketing process and functions: 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; Agricultural prices and policy: Meaning and functions of price; administered prices; need for agricultural price policy; 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; Construction of index numbers; Visit to a local market 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; Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning;

B.Sc. (Hons.) Agriculture

ESL-222* **ENVIRONMENTAL STUDIES-II**

Time: 3 Hours **Max. Marks: 50**
Theory: 40
Internal Assessment: 10
Periods per week 2+0

Section A (12 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying four marks. Answer to any of the question should not exceed two pages.
Section B (16 Marks): It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying eight marks. Answer to any of the question should not exceed four pages.
Section C (12 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. 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.

2. 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.

3. Human Population and Environment:

Population growth, variation among nations.

Population explosion-Family welfare programme.

Environment and human health.

Human rights.

4. 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.

Note: In this section the students will be required to visit and write on the environment of an area/ ecosystem/vi1lage industry/disaster/mine/dam/agriculture field/waste management/ hospital etc. with its salient features, limitations, their implications and suggestion for improvement.

B.Sc. (Hons.) Agriculture

SEMESTER-V

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

Time: 3 Hours **Max. Marks: 25**
Practical = 20
Internal Assessment =05
Periods per week =0+3

Practical:

Crop planning. Raising field crops in multiple cropping systems using improved agronomic practices. Field preparation, seed treatment, nursery raising, sowing. Management of nutrient, water, weed, insect pests and diseases of crops. Harvesting, threshing, drying, winnowing, storage and marketing of produce. Preparation of balance sheet including cost of cultivation, net returns per student.

B.Sc. (Hons.) Agriculture

AGR-312 Water Management and Micro Irrigation

Time: 3 Hours

Max. Marks: 75
Theory: 40
Practical: 20
Internal assessment 10+5=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:

Definition and objectives. Water resources and irrigation development in India and Punjab. Plant water relationships. Crop water requirement and their determination methods. Effective rainfall, mulching and criteria of scheduling irrigation. Methods of irrigation- surface, sprinkler and drip irrigation. Irrigation efficiency. Conjunctive use of water. Water management in rice, wheat, maize, cotton, groundnut, sugarcane, mango, banana and tomato. Agricultural drainage.

Practical:

Determination of bulk density and field capacity by field methods. Determination of permanent wilting point. Measurement of irrigation water through flumes and weirs. Calculation of irrigation water requirement. Demonstration of furrow, check basin and basin methods of irrigation. Cost estimation of drip irrigation system. Demonstration of filter cleaning, fertigation, injection and flushing of laterals. Erection and operation of sprinkler irrigation system. Measurement of emitter discharge rate, wetted diameter and calculation of emitter discharge variability. Visit to farmers' field.

B.Sc. (Hons.) Agriculture

CHE-313 Chemistry of Agrochemicals, Plant Products and Growth Regulators

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

Theory= 20

Practical = 20

Internal Assessment 05+05=10

Periods per week 2+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 chemistry as prelude to agro chemicals. Diverse types of agrochemicals, Botanical insecticides (neem), pyrethrum, synthetic pyrethroids, Synthetic organic insecticides, major classes of important insecticide, their chemistry and uses. Fungicides major- classes chemistry and uses of carbendizim, carboxin, captan, tridemorph and copper oxychloride. Plant growth regulators. Herbicides-major-classes. Chemistry and uses of 2,4D, atrazine , glyphosate, butachlor, benthiocarb.

Practical:

Argentometric and iodometric titrations- their use in analysis of important pesticides Compatibility of fertilizers with pesticides.

B.Sc. (Hons.) Agriculture

AGE-314 Agricultural Marketing, Trade and Prices

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

Theory= 40

Practical = 20

Internal Assessment 10+5=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-concept. Definition, scope, components, classification, market structure, conduct and performance, Market functionaries, Producer's Surplus- meaning types, marketable surplus, marketed surplus, Market integration-meaning definition, types. Marketing efficiency- Meaning, definition, marketing costs, margins and price spreads, Trade-domestic trade, free trade, international trade. World trade Organisation implications of Agreement on agriculture, Market access- domestic support export subsidies, Export-Import polity. Co-operative marketing, State trading, public procurement agencies, Quality control of agricultural products Agricultural marketing polity. Risk in marketing, speculations and hedging, Future trading, Contract farming.

Practical:

Identification of Marketing channels, Study of apni mandi, regulated markets, unregulated markets, livestock markets, Price spread analysis, Visit to market institutions. Analysis of information of daily prices, marketed and marketable surplus of different commodities.

B.Sc. (Hons.) Agriculture

PPL-315 Plant Pathogens and Principles of Plant Pathology

Time: 3 Hours **Max. Marks: 75**
Theory: 40
Practical: 20
Internal assessment 10+5=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, importance and general characters of fungi, bacteria, fastidious bacteria, nematodes, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa and phanerogamic parasites . Definition, objectives, history, terms and concept of plant pathology. Survival and dispersal of plant pathogens. Phenomenon of infection. Study of genera *Pythium, Phytophthora, Albugo, Sclerospora, Plasmopara, Rhizopus, Oidium, Erysiphe, Puccinia, Hemileia, Ustilago, Agaricus, Pleurotus, Ganoderma, Colletotrichum, Pyricularia, Trichoderma, Fusarium, Alternaria, Cercospora, Sclerotinia, Xanthomonas, Pseudomonas, Meloidogyne and Anguina* . Defence mechanisms in plants. Plant disease epidemiology and forecasting. General principles of plant disease management. Plant quarantine and inspection. Genetic, cultural, biological, physical and chemical methods of plant disease management. Integrated plant disease management .

Practical:

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

B.Sc. (Hons.) Agriculture

ENT-316 Insect Pests of Crops and Stored Grains

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

Theory= 40

Practical = 20

Internal Assessment 10+5=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:

Distribution, biology, symptoms of damage and management strategies of insect pests of rice, sorghum, maize, cotton, groundnut, sugarcane, ragi (*Eleucine coracana*), wheat, pulses, sunflower, mustard, brinjal, bhindi, tomato, cruciferous and cucurbitaceous vegetables, potato, chillies, mango, citrus, grapevine, banana, pomegranate, guava, ber, apple, turmeric, onion, garlic, ginger, rose & gladiolus Stored grain insect pests-their biology damage and management.

Practical:

Identification of insect pests, their damage symptoms and management of rice, sorghum, maize, wheat, sugarcane, cotton, pulses, solanaceous, malvaceous, cruciferous and cucurbitaceous vegetables, chilli, mango, citrus, sapota and stored grains.

B.Sc. (Hons.) Agriculture

PBG-317 **Principles of Plant Breeding**

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

Theory= 40

Practical = 20

Internal Assessment 10+5=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:

Classification of plants, botanical description, floral biology, emasculation and pollination techniques in cereals, millets, pulses, oilseeds, fibers, plantation crops etc. Aims and objectives of Plant Breeding; Modes of reproduction. Significance in plant breeding; Modes of pollination and their genetic consequences. Methods of breeding – Introduction and Acclimatization; Selection, Johannsen's pure-line theory, genetic basis, pure-line selection; Hybridization, aims and objectives, types of hybridization; Methods of handling segregating generations, pedigree method, bulk method, back cross method; Incompatibility and male sterility and their utilization in crop improvement; Heterosis, inbreeding depression, exploitation of hybrid vigor, development of inbred lines, single-cross and double-cross hybrids; population improvement programmes, recurrent selection, synthetics and composites; Methods of breeding vegetatively propagated crops, clonal selection; Mutation breeding; Ploidy breeding; Wide hybridization and its significance in crop improvement.

Practical:

Botanical description and floral biology; Study of megasporogenesis and microsporogenesis. Fertilization and life cycle of an angiospermic plant; Plant Breeder's kit: Hybridization techniques and precautions to be taken; Floral morphology, selfing, emasculation and crossing techniques. Field crops: rice**,** sorghum, maize, wheat, bajra, sugarcane, brassicas, groundnut, sunflower, sesamum, red gram, bengal gram, green gram, soybean, black gram, cotton, chillies, brinjal, tomato, bhindi, onion and bottle gourd. Study of male sterility and incompatibility.

B.Sc. (Hons.) Agriculture

BIT-318 Principles of Plant Biotechnology

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

Theory= 40

Practical = 20

Internal Assessment 10+5=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:

Concepts and history of plant tissue culture and plant genetic engineering. Scope and importance of plant tissue culture in crop improvement. Culture media for in-vitro cultures. Cellular totipotency, Sterilization of glassware, explants and culture media, Role of plant growth regulators in tissue culture, Culture techniques. Micro-propagation and somatic embryogenesis. Meristem culture, embryo culture and anther culture. Virus free plant production, haploid plant production and production of synthetic seed. Hybrid embryo rescue technique. Acclimatization of tissue culture raised plants. Protoplast isolation and culture. Somatic cell hybridization and cybridization. Production of secondary metabolites by plant tissue culture. Production of transgenic plants. Direct and indirect method of gene transfer. Vectors for gene transfer. Ti plasmid, Agrobacterium mediated genetic transformation. Risk associated with production and commercialization of transgenic plants. Applications of plant tissue culture and genetic engineering in agriculture.

Practical:

Requirements for Plant Tissue Culture Laboratory. Techniques in Plant Tissue Culture. Media components and preparations. Sterilization techniques and Inoculation of various explants. Aseptic manipulation of various explants. Callus induction and Plant Regeneration. Micro propagation of important crops. Anther, Embryo and Endosperm culture. Hardening / Acclimatization of regenerated plants. Somatic embryogenesis and synthetic seed production. Isolation of protoplast. Demonstration of Culturing of protoplast. Demonstration of isolation of DNA. Demonstration of gene transfer techniques- direct methods. Demonstration of gene transfer techniques- indirect methods. Demonstration of confirmation of genetic transformation. Demonstration of gel-electrophoresis techniques.

B.Sc. (Hons.) Agriculture

DAI-319 **Dairy Technology**

Time: 3 Hours **Max. Marks: 75**
Theory=40
Practical = 20
Internal Assessment 10+5=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:

Milk: Present status of milk production and availability in India and Abroad, sources of milk, Definition, Composition of milk of various species, important characteristics of major constituents of milk viz. milk fat, milk proteins, lactose and minerals. Minor constituents of milk. Factors affecting the quality and quantity of milk produced by mikh animals. Physical, chemical and Nutritive properties of milk. Market Milk : Brief introduction to Standard milk, Toned milk, Double toned milk, Flavored milk, Vitamin enriched milk, Reconstituted milk and recombined milk. Legal and ISI standards of milk. Adulterations of milk and its detection. Common preservative used in milk and their detection. Clean milk production. Milk Processing : Processes of straining, Filtration and clarification. Standardization : Definition of standardization, purpose and uses of standardization process. Use of Pearson's square method to solve the standardization problems in dairy industry. Homogenization : Definition, Effect of homogenization on milk. Uses of homogenization. Checking the effectiveness of homogenization. Pasteurization : Definition, purposes and objects of pasteurization – LTLT and HTST processes of pasteurization. Cream: Different types of cream, composition, production methods. Butter : Types of butter, composition. Cheese : Classification of cheese. Preparation methods of cheddar cheese.

Practical:

BIS and legal standards of milk and milk products, Sampling equipment and sampling of milk. Different types of milk samples. Platform tests (Acidity, COB, and Alcohol test.) Organoleptic Tests : (Physical examination of milk). Determination of milk fat percentage by Gerber's method. Determination of specific gravity by lactometer. Determination of SNF percentage and TS percentage of milk with lactometer. Reporting on the suitability of milk for heat processing. Reporting on the quality of given sample of milk. Visit to milk processing plants. Preparation of flavored milk.

B.Sc. (Hons.) Agriculture

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

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

Time: 3 Hours **Max. Marks: 25**
Practical = 20
Internal Assessment =05
Periods per week =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:

Crop planning. Raising field crops in multiple cropping systems using improved agronomic practices. Field preparation, seed treatment, nursery raising, sowing, nutrient management, water management, weed management and management of insect pests and diseases of crops. Harvesting, threshing, drying, winnowing, storage and marketing of produce. Preparation of balance sheet including cost of cultivation, net returns per student.

B.Sc. (Hons.) Agriculture

EST-322 Renewable Energy

Time: 3 Hours **Max. Marks: 75**
Theory= 40
Practical = 20
Internal Assessment 10+5=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:-

1) Energy Source their Classification & Contribution in Agriculture Sector.
2) Biomass utilization for Biofuel production & their Application.
3) Types of Biogas plants &Gasifiers, Pyrolysis, gasification process.
4) Production & utilization of:-

- Bio-gas
- Bio-alcohol
- Bio-diesel
- Bio-oil

5) Introduction of solar energy Collection & their application
6) Familiarization with solar energy gadgets

- Solar Cooker
- Solar water heater

7) Application of Solar Energy:

- Solar drying
- Solar pond
- Solar distillation

8) Solar photovoltaic system & their applications
9) Introduction of wind energy & application.

Practical:-

1. To study biogas plant
2. To study gasifiers
3. To study the production farm of biodiesel & biofuels
4. To study Briquettes &Briquetting Mechanism
5. Familiarization with different Solar energy gadgets.
6. To study solar photovoltaic system :-

- Solar light
- Solar pumping
- Solar fencing

7. To study solar cooker
8. To study solar drying system
9. To study solar distillation & Solar Pond.
10. Field visit to Renewable energy production Site.

B.Sc. (Hons.) Agriculture

B.Sc. (Hons.) Agriculture

STA-323 **Basic Statistics**

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

Theory= 40

Practical = 20

Internal Assessment 10+5=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:

Definition of statistics, its use and limitations. Frequency distribution and frequency curves. Measures of central tendency. Measures of dispersion. Probability. Normal distribution and its properties. Introduction to sampling. Tests of significance, SND test for means (single sample and two samples), Student's t-test for single sample, two samples and paired t-test. F-test. Chi-square test in 2x2 contingency table. Yate's correction for continuity. Correlation. Computation of correlation coefficient 'r' and its testing. Liner regression of Y on X and X on Y. Interrelationship between 'r' and the regression coefficients. Layout and analysis of Completely Randomized Design (CRD), Randomized Block Design (RBD) and Latin Square Design (LSD).

Practical:

Construction of frequency distribution tables and frequency curves, computation of arithmetic mean, median, mode, standard deviation, variance and coefficient of variation for ungrouped and grouped data, SND test for means, Student's t-test, F-test, Chi-square test. Correlation coefficient 'r' and its testing, Fitting of regression equations. Analysis of CRD, RBD and LSD.

B.Sc. (Hons.) Agriculture

AGE-324: Production Economics, Farm Management and Agricultural Finance

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

Theory: 40

Practical: 20

Internal assessment 10+5=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 Economics- meaning, definition, nature and scope, Laws of returns, Factor Product Relationship- determination of optimum input and output. farm Management- meaning , definition and importance, Economic Principles applied to the organizations of farm business, types and systems of farming, Farm Planning and Budgeting . Risk and Uncertainty. Agricultural Financial -nature and scope, compounding and discounting. Agricultural credit-meaning,definition , need and classification, Credit appraisal, History of financing agriculture in India. Agricultural Financial Institutions. Assessment of crop losses. Determination of compensation, Crop insurance. Agricultural Cooperation. philosophy and principles. History of Indian co-operative credit structure. Reoganization of cooperative credit structure and single window system.

Practical:

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

B.Sc. (Hons.) Agriculture

PPL-325 Diseases of Field Crops and their Management

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

Theory: 40

Practical: 20

Internal assessment 10+5=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:

Economic importance, symptoms, causal organism, epidemiology, disease cycle and integrated management of diseases of rice, sorghum, *bajra*, maize, wheat, barley, sugarcane, turmeric, tobacco, groundnut, sesamum, castor, sunflower, rapeseed & mustard, cotton, pulses, mentha and *berseem*.

Practical:

Study of symptoms and host-parasite relationships of important diseases of field crops. Field visits at appropriate time during the semester.

B.Sc. (Hons.) Agriculture

PPL-326 Diseases of Horticultural Crops and their Management

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

Theory= 40

Practical = 20

Internal Assessment 10+5=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:

Economic importance, symptoms, causal organism, disease cycle and integrated management of diseases of citrus, mango, banana, grapevine, pomegranate, papaya, guava, sapota, *ber*, apple, pear, peach, plum, chilli, brinjal, okra, potato, crucifers, cucurbits, tomato, pea, beans, onion, garlic, mulberry, tea, rose, chrysanthemum, gladiolus, marigold and jasmine.

Practical:

Study of symptoms and host-parasite relationships of important diseases of horticultural crops. Field visits at appropriate time during the semester.

B.Sc. (Hons.) Agriculture

PBG-327 Breeding of Field and Horticultural Crops

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

Theory= 40

Practical = 20

Internal Assessment 10+5=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:

Breeding objectives and important concepts of breeding self-pollinated, cross-pollinated and vegetatively propagated crops; Study in respect of origin, distribution of species, wild relatives and forms, Cereals, (rice, wheat, maize, millets, sorghum, bajra); Pulses (red gram, green gram, black gram, soybean); Oilseeds (Groundnut, sesame, sunflower, brassicas) etc,Fibres (Cotton) etc, Vegetables (Tomato, bhindi, chilli, cucumbers); Flowers crops (Chrysanthemum, rose, gaillardia and marigold); Fruit crops (amla, guava, mango, banana, papaya); Major breeding procedures for development of hybrids/varieties of various crops; Plant genetic resources, their conservation and utilization in crop improvement; Ideotype concept in crop improvement; Breeding for resistance to biotic and abiotic stresses. Variability in pathogens and pests; Genetic basis of adaptability to unfavourable environments; Definition of biometrics, assessment of variability i.e., additive, dominance and epistasis and their differentiation; genotype x environment interaction and influence on yield/performance. IPR and its related issues.

Practical:

Emasculation and Hybridization techniques; Handling of segregating generations- pedigree method, bulk method, back cross methods; Field layout of experiments; Field trials, maintenance of records and registers; Estimation of heterosis and inbreeding depression; Estimation of heritability; General and Specific Combining Ability(GCA and SCA); Estimation of variability parameters; Parentage of released varieties/hybrids; Study of quality characters; Sources of donors for different characters; Visit to seed production and certification plots; Visit to AICRP trials and programmes;

B.Sc. (Hons.) Agriculture

PFE-328 Protected Cultivation and Post Harvest Technology

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

Theory= 40

Practical = 20

Internal Assessment 10+5=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, planning, design and application of green houses. Plant response to green house environment. Green house equipment. Material of construction for traditional and low cost green houses. Irrigation systems used in greenhouses. Cost estimation and economic analysis. Crop selection and constraints of greenhouse cultivation. Growing media, drainage, flooding and leaching, soil pasteurization, nutrient film technique (NFT)/ hydroponics.

Winnowing . Groundnut decorticators. Maize and castor shellers. Drying- grain drying, types of drying types of dryers. Evaporators- principle and types. Quality standards.

Importance. Maturity indices, harvesting and post harvest handling of fruits and vegetables. Maturity and ripening process. Chemicals used for delaying and hastening ripening. Methods of storage and low cost storage structures. Methods of packing, packaging materials and transport.

Practical:

Study of different types of green houses. Estimation of drying rate of agricultural products. Testing of soil and water suitability and fertigtion requirements for greenhouse. Judging maturity of various fruits and vegetables. Conservation of zero energy cool chambers for on farm storage. Determination of physiological loss in weight, total soluble solids, total sugars, acidity and ascorbic acid content in fruits and vegetables. Effect of ethylene on ripening of fruits. Preservation by drying and dehydration. Visit to local market yards, cold storage units and packing house. Visit to commercial green houses. Growing media-their preparation and pasteurization/sterilization.

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

FSC-411 Nursery Management of Horticultural Crops

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

Theory: 80

Practical: 40

Internal Assessment: 20+10=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. (Hons.) Agriculture

FSC-412 **Fundamentals of Fruit Production**

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

Theory: 60

Practical: 20

Internal Assessment: 15+05=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. (Hons.) Agriculture

B.Sc. (Hons.) Agriculture

VSC-413 Commercial Vegetable Production

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:

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. (Hons.) Agriculture

VSC-414 Vegetable Breeding and Seed Production

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:

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. (Hons.) Agriculture

AGR-411 **Weed Management**

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:

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. (Hons.) Agriculture

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. (Hons.) Agriculture

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

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:

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. (Hons.) Agriculture

FOR-414 Production Technology of Economic Forest Trees

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:

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. (Hons.) Agriculture

EXT-411 Communication and Information Technology

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:

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. (Hons.) Agriculture

MGT-412 **Financial and Project Management**

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:

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. (Hons.) Agriculture

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. (Hons.) Agriculture

AGE-414 **Micro Economic Analysis**

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:

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. (Hons.) Agriculture

ENT-411 **Apiculture**

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:

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. (Hons.) Agriculture

PPL-412 Post Harvest Diseases and their Management

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:

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. (Hons.) Agriculture

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. (Hons.) Agriculture

NEM-414 **Plant Nematology**

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:

- 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. (Hons.) Agriculture

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. (Hons.) Agriculture
SEMESTER-VIII

FSC-421 **Commercial Fruit Production**

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:

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. (Hons.) Agriculture

FSC-422 Processing and Value Addition of Horticultural Crops

Time: 3 Hours **Max. Marks: 100**
Theory: 60
Practical: 20
Internal Assessment: 15+05=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. (Hons.) Agriculture

VSC-423 Forcing Techniques in Vegetable Production

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

Theory: 60

Practical: 20

Internal Assessment: 15+05=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. (Hons.) Agriculture

FCL-424 Commercial Floriculture and Landscaping

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:

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. (Hons.) Agriculture

AGR-421 Farming Systems and Sustainable Agriculture

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:

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. (Hons.) Agriculture

SSC-422 Soil Physical and Biological Environment

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:

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. (Hons.) Agriculture

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. (Hons.) Agriculture

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

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:

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. (Hons.) Agriculture

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. (Hons.) Agriculture

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. (Hons.) Agriculture

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

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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. (Hons.) Agriculture

EXT-424 Visual and Graphic Communication

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:

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. (Hons.) Agriculture

PPL- 421 Biocontrol and Integrated Disease Management

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:

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. (Hons.) Agriculture

ENT-422 Biocontrol and Integrated Pest Management

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:

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. (Hons.) Agriculture

ENT-423 Pesticides and Plant Protection Equipment

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:

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. (Hons.) Agriculture

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. (Hons.) Agriculture

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