FACULTY OF AGRICULTURE & FORESTRY

SYLLABUS

For

B.Sc. AGRICULTURE (HONS.)

(Semester I – VI)
Session: 2014-15
&
Part–IV
(ANNUAL SYSTEM)
Examination: 2014-15

GURU NANAK DEV UNIVERSITY AMRITSAR

(ii) Subject to change in the syllabi at any time.
Please visit the University website time to time.

B.Sc. AGRICULTURE (HONS.) Semester System

Scheme of Studies & Examination

Semester-I

Sr. No.	Course Code	Subject	Periods per Week		Total Marks		Grand Total
			Th.	Prac.	Th.	Prac.	
1.	Agron.104	Introductory Agriculture	4	3	50	25	75
2.	Agromet 102	Introductory Agrometerology	4	3	50	25	75
3.	Micro 101	Elementary Microbiology	4	3	50	25	75
4.	Soils 103	Introduction to Soil Science	4	3	50	25	75
5.	Eco.101	Principles of Agricultural Economics	4	0	50	--	50
6.	Bot 103/ Maths 104	Basic Botany/ Basic Maths–I	2 4	2 0	25 50	25 --	50 50
7.	Eng.102	Communication Skills in English	4	0	50	--	50
8.		Punjabi (Compulsory) / Basic Punjabi (Mudhli Punjabi)	4	0	50	--	50

Note:

1. Mathematics for those students who have passed 10+2 (Medical)
2. Botany 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 System

Scheme of Studies & Examination

Semester-II

Sr. No.	Course Code	Subject	Periods per Week		Total Marks		Grand Total
			Th.	Pract.	Th.	Pract.	
1.	Agron 106	Water Management and Micro Irrigation	4	3	50	25	75
2.	CSE 101	Introduction to Computer Application	3	3	25	25	50
3.	Ext. 101	Dimensions of Agriculture Extension	4	3	50	25	75
4.	PBG 103	Principles of Genetics	4	3	50	25	75
5.	Soils 104	Soil Chemistry, Soil Fertility and Nutrient Management	4	3	50	25	75
6.	Veg. 101	Vegetable Production Technology	4	3	50	25	75
7.	Zoo 103/ Maths 108	Basic Zoology/ Basic Maths–II	2 4	2 0	25 50	25 --	50 50
8.	Eng. 103	Communication Skills in English			35	15	50
9.		Punjabi (Compulsory) / Basic Punjabi (Mudhli Punjabi)			50	--	50

Note:

1. Mathematics for those students who have passed 10+2 (Medical)
2. Botany 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 System

Scheme of Studies & Examination

Semester-III

Sr. No.	Course Code	Subject	Periods per week		Marks		Grand Total
			Th.	Pract.	Th.	Pract.	
1	B.Sc.Agri. Agron- 203	Principles of Agronomy- I (Kharif Crops)	4	3	50	25	75
2	B.Sc.Agric. Bot- 206	Crop Physiology	4	3	50	25	75
3	B.Sc.Agri.Ent.-204.	Fundamentals of Insect Morphology and Systematics	4	3	50	25	75
4	B.Sc. Agri. Ext.-201	Extension Methodologies and Communication Skills for Transfer of Technology	4	3	50	25	75
5	B.Sc Agri. FPM-202	Farm Power and Machinery	4	3	50	25	75
6.	B.Sc Agri. Soil-204	Manures and Fertilizers	4	0	50	00	50
7.	B.Sc Agri. Hort.-203	Production Technology of Fruit Crops	4	3	50	25	75
8.	B.Sc Agri. Soil-203	Soil Physics and Erosion Management	4	3	50	25	75
9.	B.Sc Agri. Pl.Path-201	Plant Pathogens and Principles of Plant Pathology	4	3	50	25	75
10.	ESL-221*	Environmental Studies (EVS)			50		
		Total	**36**	**24**	**450**	**200**	**650**

Note: * The marks of Paper ESL-221 (Semester - III) (Environmental Studies will not be added in the Total Marks.

B.Sc. AGRICULTURE (HONS.) Semester System

Semester-IV

Sr. No.	Course Code	Subject	Periods per week		Marks		Grand Total
			Th.	Pract.	Th.	Pract.	
1	B. Sc. Agri. Agron- 204	Principal of Agronomy-II (Rabi Crops)	4	3	50	25	75
2	B. Sc. Agric. Eco- 202	Production Economics, Farm Management and Agricultural Finance	4	3	50	25	75
3	B.Sc.Agri.Ent.-205	Insect Ecology and Integrated PestManagement	4	3	50	25	75
4	B.Sc. Agri. Ext.-202	Fundamentals of Rural Sociology and Educational Psychology	4		50	00	50
5	B. Sc Agri. LPM-205	Livestock Production and Management	4	3	50	25	75
6.	B. Sc Agri. PBG-202	Principles of Seed Technology	4	3	50	25	75
7.	B. Sc Agri. Pl.Path-202	Diseases of Field Crops and their Management	4	3	50	25	75
8.	B. Sc. Agri. Agron- 205	Organic Farming	4	3	50	25	75
9.	B.Sc. Agri. SWE 101	Fundamentals of Soil and Water Conservation Engineering	4	3	50	25	75
10.	ESL-222*	Environmental Studies (EVS)			50		
		Total	**36**	**24**	**450**	**200**	**650**

Note: * The marks of Paper ESL-222 (Semester - IV) (Environmental Studies will not be added in the Total Marks.

B.Sc. AGRICULTURE (HONS.) Semester System

Semester-V

Course	Subject	Period Per weak		Marks		Internal Assessment		Total Marks		Grand Total
		Th.	Prt.	Th.	Prt.	Th.	Prt.	Th.	Prt.	
Agron-302	Practical Crop Production-I *(Kharif Crops)*	0	3	0	20	0	05	0	25	25
Biotech-310	Principles of Plant Biotechnology	4	3	40	20	10	05	50	25	75
Chem-302	Chemistry of Agrochemicals, Plant Products and Growth Regulators	2	3	20	20	05	05	25	25	50
Econ-303	Agricultural Marketing, Trade and Prices	4	3	40	20	10	05	50	25	75
Ent-302	Insect Pests of Crops and stored Grain	4	3	40	20	10	05	50	25	75
FT-302	Introduction to Food Science and Post Harvest Value Addition	4	3	40	20	10	05	50	25	75
Forst-301	Introductory Forestry	4	3	40	20	10	05	50	25	75
Biochem-301	Elementary Biochemistry	4	3	40	20	10	05	50	25	75
PBG-303	Principles of Plant Breeding	4	3	40	20	10	05	50	25	75
	Total	**30**	**27**	**300**	**180**	**75**	**45**	**375**	**225**	**600**

Semester- VI

Course	Subject	Period Per weak		Marks		Internal Assessment		Total Marks		Grand Total
		Th.	Prt.	Th.	Prt.	Th.	Prt.	Th.	Prt.	
Agron-303	Practical Crop Production-II *(Rabi Crops)*	0	3	0	20	0	05	0	25	25
Mgt.-303	Fundamentals of Agri-business Management and Entrepreneurship Development	4	0	40	00	10	00	50	00	50
Stat-301	Basic Statistics	4	3	40	20	10	05	50	25	75
EST-302	Renewable Energy	4	3	40	20	10	05	50	25	75
Flori.-301	Flower Cultivation and Landscape Gardening	4	3	40	20	10	05	50	25	75
Pl.Path.-303	Diseases of Horticultural Crops and Their Management	4	3	40	20	10	05	50	25	75
PBG-304	Breading of Field and Horticulture Crops	4	3	40	20	10	05	50	25	75
PFE-304	Protected Cultivation and Post Harvest Technology	4	3	40	20	10	05	50	25	75
Hort.-301	Post Harvest Management of Fruits and Vegetables	4	3	40	20	10	05	50	25	75
	Total	**32**	**24**	**300**	**180**	**75**	**45**	**375**	**225**	**600**

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

Scheme of Studies

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Pract.	Th.	Pract.	Th.	Pract.	Th.	Pract.	
1.	B.Sc. Agric . F.M	Farm Management & Production Economics	4	3	80	40	20	10	100	50	150
2.	B.Sc. Agric. Ento.	Economic Entomology	4	3	80	40	20	10	100	50	150
3.	B.Sc. Agric. Ext.	Agricultural Extension	4	3	80	40	20	10	100	50	150
4.	B.Sc. Agric. Stats.	Agricultural Statistics	4	3	80	40	20	10	100	50	150
5.	B.Sc. Agric. Oleri & Flori.	Olericulture, Floriculture & Landscaping.	4	3	80	40	20	10	100	50	150
	Elective (I, II & III) Separate list of each elective (Agron, Soil, Hort & Agric. Econ.)		12	12	240	80	60	20	300	100	400
		Total	**32**	**27**	**640**	**280**	**160**	**70**	**800**	**350**	**1150**

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

Scheme of Studies

(For Agronomy Elective)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Pract.	Th.	Pract.	Th.	Pract.	Th.	Pract.	
1.	B.Sc. Agric. Elect-I (Agron.)	Seed Production Technology	4	6	80	40	20	10	100	50	150
2.	B.Sc. Agric. Elect-II (Agron.)	Ecology and Crop Phsiology.	4	6	80	40	20	10	100	50	150
3.	B.Sc. Agric. Elect-III (Agron.)	Crop Production under Special Situation: Soil Fertility and Fertilizer Use	4	--	80	--	20	--	100	--	100

(For Soil Elective)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Pract.	Th.	Pract.	Th.	Pract.	Th.	Pract.	
1.	B.Sc. Agric. Elect-I (Soil.)	Systematic Study of Soils in Relation to Geology, Genesis, Classification Hydrology & Erosion.	4	6	80	40	20	10	100	50	150
2.	B.Sc. Agric. Elect-II (Soil.)	Fundamentals of Soil Chemistry, Fertility, Biology & Bio-Chemistry including Water & Fertilizer Testing.	4	6	80	40	20	10	100	50	150
3.	B.Sc. Agric. Elect-III (Soil.)	General Physical Chemistry	4	--	80	--	20	--	100	--	100

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

Scheme of Studies

(For Horticulture Elective)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Pract.	Th.	Pract.	Th.	Pract.	Th.	Pract.	
1	B.Sc. Agric. Elect-I (Hort.)	Fundamentals of Fruit Production.	4	6	80	40	20	10	100	50	150
2	B.Sc. Agric. Elect-II (Hort.)	Systematic Pomology, Propagation & Nursery Management.	4	6	80	40	20	10	100	50	150
3	B.Sc. Agric. Elect-III (Hort.)	Fruit Growing.	4	--	80	--	20	--	100	--	100

(For Agric. Economics Elective)

Sr. No.	Course Code	Subject	Periods per Week		Marks		Int. Assessment		Total Marks		Grand Total
			Th.	Pract.	Th.	Pract.	Th.	Pract.	Th.	Pract.	
1	B.Sc. Agric. Elect-I (Agric. Econ.)	Economic Problems of Indian Agriculture & Rural Sociology.	4	6	80	40	20	10	100	50	150
2	B.Sc. Agric. Elect-II (Agric. Econ.)	Agricultural Marketing & Co-operation.	4	6	80	40	20	10	100	50	150
3	B.Sc. Agric. Elect-III (Agric. Econ.)	Micro & Macro Economics	4	--	80	--	20	--	100	--	100

B.Sc. AGRICULTURE (HONS.) Semester – I

Agron. 104: **Introductory Agriculture**

Time: 3 Hours **Max. Marks: 75**
Theory: 50
Practical: 25
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

Art, science and business of crop production. Basic elements and factors affecting crop production. History of agricultural development. Ancient Indian agriculture in civilization era. Chronological agricultural technology development in India. Agricultural growth. Contrasting food chains. Diversity in physiography- soil groups, marine, livestock and water. Liabilities- soil and weather factors. Dry and irrigated agriculture. Farming systems approach. Nutritional and rural life standards.

Practical

Identification of various crops, and their seeds; Weeds- identification and Control measures; Working of Agricultural implements: Calibration of seed drills; Identification, computation of Doses and methods of application of fertilizer; farm visit for acutance with field problems.

B.Sc. AGRICULTURE (HONS.) Semester – I

Agromet. 102: Introductory Agrometeorology

Time: 3 Hours **Max. Marks: 75**
Theory: 50
Practical: 25
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

Agrometeorology- Definition, practical utility and scope. General climatology. Structure and composition of earth's atmosphere. Elements and factors of weather and climate - temperature, pressure, wind, solar radiation and moisture. Impact of climate on crops and livestock distribution and production. Agro climatic indices – definitions and applications in agriculture. Effect of environmental factors on crop growth. Weather hazards in agriculture. Climatic classifications. Agro climatic regions of Punjab and India. Basics of field microclimate modification. Introduction to monsoons. Elementary aspects of weather forecasting. Effects of climate change on agriculture.

Practical

Site selection for Agrometeorological Observatory. Project on setting up, recording and maintenance of instruments in a meteorological observatory. Measurement of temperature, rainfall, evaporation, atmospheric pressure, sunshine duration, solar radiation, wind direction, wind speed and relative humidity. Study of weather forecasting and synoptic charts. Processing, presentation and interpretation of climatic data in relation to crops.

Micro 101: Elementary Microbiology

Time: 3 Hours **Max. Marks: 75**
Theory: 50
Practical: 25
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 Microbiology – its applied areas. Discovery of microorganisms and their role in fermentation. Germ theory of disease and protection. Structure of eukaryotic and prokaryotic cell. Major groups of eukaryotes – fungi, algae and protozoa. Major groups of prokaryotes – actinomycetes, cyanobacteria, arhaebacteria, rickettsias and chlamydia. Bacterial growth. Metabolism in bacteria – ATP generation. chemoautotrophy, photoautotrophy, respiration, fermentation. Bacteriophages – structure and properties, lytic and lysogenic cycles, viriods, prions. Genetic recombinations. Microbial groups in soil. Microbial transformation of carbon, nitrogen, phosphorus and sulphur. Biological nitrogen fixation. Microbes in composting. Microbiology of water and food. Beneficial microorganisms in agriculture – biofertilizers, microbial pesticides. Biodegradation. Biogas production. Plant–microbe interactions. Introduction to mushrooms and mushroom growing. Edible and poisonous mushrooms. Cultivation technology of mushrooms.

Practical

Familiarization with instruments and other materials in a Microbiology laboratory. Practice of aseptic methods on nutrient broth, slants and agar plate. Methods of sterilization and preparation of media and glassware. Sterilization of nutrient broth by filtration. Plating methods for isolation and purification of bacteria. Identification of bacteria by staining methods. Enumeration of bacteria by staining, pour plate and spread plate methods. Cultivation technology of mushrooms. Tissue culture preparation and maintenance of edible fungi. Spawn production.

Soils 103: Introduction to Soil Science

Time: 3 Hours **Max. Marks: 75**
Theory: 50
Practical: 25
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

Concept of land, soil and soil science. Composition of earth crust and its relationship with soils. Rocks and minerals. Weathering. Soil forming factors and processes. Soil profile. Soil colour. Elementary knowledge of taxonomic classification of soils. Soils of Punjab and India. Soil physical properties. Soil texture- textural classes. Soil structure- classification, soil aggregation and significance, soil consistency, soil crusting, bulk density and particle density of soils and porosity, their significance and manipulation. Soil colloids- properties, nature, types and significance. Sources of charges in clay minerals. Ion exchange, CEC, AEC – factors affecting and adsorption of ions. Soil organic matter- decomposition, mineralization, humus. Carbon cycle, C: N ratio. Soil organisms and their beneficial and harmful roles.

Practical

Determination of bulk density and particle density. Aggregate size analysis. Soil mechanical analysis. Analytical chemistry- basic concepts, techniques and calculations, collection and processing of soil samples for analysis of organic carbon, pH, EC, available N, P, K and S. Study of a soil profile. Identification of rocks and minerals.

B.Sc. AGRICULTURE (HONS.) Semester – I

Econ. 101: Principles of Agricultural Economics

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

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

Agricultural Economics- Meaning, definition, subject matter, basic economic concepts. Wants- Meaning and characteristics. Theory of consumption- marginal utility analysis. Demand- Meaning, definition, kinds of demand, law of demand, change in demand. Elasticity of demand- various types, degrees, methods of measurement, importance and factors influencing elasticity of demand. Consumer's surplus– mWelfare Economics – meaning, Pareto's optimality. National Income- concepts, measurement. meaning, definition, importance. Perfect and Imperfect competition- definition, types and characteristics.

National income- Concepts, Measurement. Inflation – Meaning, definition, kinds of inflation.

B.Sc. AGRICULTURE (HONS.) Semester – I

Bot. 103: **Basic Botany**

Time: 3 Hours **Max. Marks: 50**
Theory: 25
Practical: 25
Periods per week 2+2

Instructions for the Paper Setters:

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

Theory

Plant kingdom- features of each group. Morphology of root, stem, leaf, flower and inflorescence. Pollination and fertilization. Fruit and seed. Cell structure. Tissue types. Internal structure of root, stem and leaf. Plant taxonomy and systems of classification. Characteristic features and economic importance of Cruciferae, Malvaceae, Leguminosae, Cucurbitaceae, Solanaceae and Gramineae.

Practical

Salient features of each group of plant kingdom, morphology and modification of root, stem and leaf, flower and types of inflorescence, structure of various types of seeds and fruits, cell structure and tissue types, structure of monocot and dicot root, stem and leaf, permanent slides, characteristic features of economically important families.

Math. 104: Basic Mathematics - I

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

Complex numbers. Geometric series. Logarithms. Binomial theorem for positive index. Trigonometric identities and allied angles, graphs of trigonometric functions, addition and subtraction formulae, sum and product formulae, multiple and sub-multiple angles.

B.Sc. AGRICULTURE (HONS.) Semester – I

COMMUNICATION SKILLS IN ENGLISH
(For Colleges (Regular & Private))

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

Course Contents:

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) Comprehension questions in multiple choice format
c) Short comprehension questions based on content and development of ideas

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

Activities:

a) Formatting personal and business letters.
b) Organising the details in a sequential order
c) Converting a biographical note into a sequenced resume or vice-versa
d) Ordering and sub-dividing the contents while making notes.
e) Writing notices for circulation/ boards

Suggested Pattern of Question Paper:

The question paper will consist of five skill–oriented questions from Reading and Writing Skills. Each question will carry 10 marks. The questions shall be phrased in a manner that students know clearly what is expected of them. There will be internal choice wherever possible.

10x5=50 Marks

i) Multiple choice questions on the language and meanings of an unseen passage.

ii) Comprehension questions with short answers on content, progression of ideas, purpose of writing etc. of an unseen passage.

iii) Personal letter and Official/Business correspondence

iv) Making point-wise notes on a given speech/ technical report OR
Writing notices for public circulation on topics of professional interest

v) Do as directed (10x1= 10 Marks) (change of voice, narration, combination of 2 simple sentences into one, subject-verb agreement, using appropriate tense, forms of verbs.

Recommended Books:

1. Oxford Guide to Effective Writing and Speaking by John Seely.
2. The Written Word by Vandana R Singh, Oxford University Press

B.Sc. AGRICULTURE (HONS.) Semester – I

Paper-V: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਸਮਾਂ : 3 ਘੰਟੇ ਕੁਲ ਅੰਕ : 50

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਗਿਆਨ ਮਾਲਾ** (ਵਿਗਿਆਨਕ ਤੇ ਸਮਾਜ-ਵਿਗਿਆਨਕ ਲੇਖਾਂ ਦਾ ਸੰਗ੍ਰਹਿ),
   (ਸੰਪਾ. ਡਾ. ਸਤਿੰਦਰ ਸਿੰਘ, ਪ੍ਰੋ. ਮਹਿੰਦਰ ਸਿੰਘ ਬਨਵੈਤ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
   ਲੇਖ : ਪਹੀਆ ਪ੍ਰਦੂਸ਼ਣ, ਭਰੂਣ ਹੱਤਿਆ ਦੇ ਦੇਸ਼ ਵਿਚ, ਨਾਰੀ ਸ਼ਕਤੀ, ਵਾਤਾਵਰਣੀ ਪ੍ਰਦੂਸ਼ਣ ਅਤੇ ਮਨੁੱਖ, ਏਡਜ਼ : ਇਕ ਗੰਭੀਰ ਸੰਕਟ।
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 ਨਿਬੰਧ ਦਾ ਸਾਰ ਜਾਂ ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ (ਦੋ ਵਿਚੋਂ ਇਕ) ।	10 ਅੰਕ
2.	ਰੇਖਾ ਚਿਤਰ : ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਸ਼ਖ਼ਸੀਅਤ ਦੇ ਗੁਣ	10 ਅੰਕ
3.	ਪੈਰ੍ਹਾ ਰਚਨਾ : ਤਿੰਨ ਵਿਸ਼ਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਇਕ ਉਤੇ ਪੈਰ੍ਹਾ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇ ।	5 ਅੰਕ
4.	ਪੈਰ੍ਹਾ ਦੇ ਕੇ ਉਸ ਬਾਰੇ ਪੰਜ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ।	5 ਅੰਕ
5.	ਨੰਬਰ 5 ਉਤੇ ਦਿੱਤੀ ਵਿਆਕਰਣ ਦੇ ਆਧਾਰ 'ਤੇ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ।	10 ਅੰਕ
6.	ਨੰਬਰ 6 ਵਿਚ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਪਹਿਲੀ ਭਾਸ਼ਾ ਅਤੇ ਦੂਜੀ ਭਾਸ਼ਾ ਵਜੋਂ ਅਧਿਆਪਨ, ਮਹੱਤਵ ਅਤੇ ਸਮੱਸਿਆਵਾਂ ਬਾਰੇ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਦੋ ਦਾ ਉੱਤਰ ਦੇਣਾ ਹੋਵੇਗਾ।	5×2=10 ਅੰਕ

B.Sc. AGRICULTURE (HONS.) Semester – I

ਮੁੱਢਲੀ ਪੰਜਾਬੀ

(In lieu of Compulsory Punjabi)

ਪਾਠ-ਕ੍ਰਮ

ਸਮਾਂ : ਤਿੰਨ ਘੰਟੇ **ਕੁੱਲ ਅੰਕ : 50**

ਪੰਜਾਬੀ ਭਾਸ਼ਾ
ਗੁਰਮੁਖੀ ਲਿਪੀ

ਗੁਰਮੁਖੀ ਲਿਪੀ : ਬਣਤਰ ਅਤੇ ਤਰਤੀਬ 20 ਅੰਕ

2. ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫ਼ੀ
ਸੂਰਾਂ ਦੀ ਵੰਡ ਅਤੇ ਉਚਾਰਨ

ਵਿਅੰਜਨਾਂ ਦੀ ਵੰਡ ਅਤੇ ਉਚਾਰਨ 15 ਅੰਕ

3. ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਰਚਨਾ
ਸਾਧਾਰਨ ਸ਼ਬਦ

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ 15 ਅੰਕ

ਯੂਨਿਟ ਅਤੇ ਥੀਮ:

1. ਪੰਜਾਬੀ ਭਾਸ਼ਾ : ਨਾਮਕਰਣ ਅਤੇ ਸੰਖੇਪ ਜਾਣ ਪਛਾਣ, ਗੁਰਮੁਖੀ ਲਿਪੀ : ਨਾਮਕਰਣ, ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ; ਪੈਂਤੀ ਅੱਖਰੀ, ਅੱਖਰ ਕ੍ਰਮ, ਸੂਰ ਵਾਹਕ (ਓ ਅ ੲ), ਲਗਾਂ ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ।
2. ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫ਼ੀ ਅਤੇ ਉਚਾਰਨ ; ਸੂਰਾਂ ਦੀ ਵੰਡ ਅਤੇ ਉਚਾਰਨ (ਲਘੂ-ਦੀਰਘ ਸੂਰ) ; ਸੂਰ ਅਤੇ ਲਗਾਂ ਮਾਤਰਾਂ ; ਵਿਅੰਜਨਾਂ ਦੀ ਵੰਡ ਅਤੇ ਉਚਾਰਨ ; ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣਾਂ (ਹ, ਰ, ਵ) ਦਾ ਉਚਾਰਨ ; ਲ ਅਤੇ ਲ਼ ਦਾ ਉਚਾਰਨ ; ਭ,ਧ,ਢ,ਝ,ਘ ਦਾ ਉਚਾਰਨ; ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣਾਂ ਦਾ ਉਚਾਰਨ।
3. ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਰਚਨਾ: ਸਾਧਾਰਨ ਸ਼ਬਦ; ਇਕੱਲਾ ਸੂਰ (ਜਿਵੇਂ ਆ) ; ਸੂਰ ਅਤੇ ਵਿਅੰਜਨ (ਜਿਵੇਂ ਆਰ) ; ਵਿਅੰਜਨ ਅਤੇ ਸੂਰ (ਜਿਵੇਂ ਪਾ) ; ਵਿਅੰਜਨ ਸੂਰ ਵਿਅੰਜਨ (ਜਿਵੇਂ ਪਾਰ) ; ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ; ਲਿੰਗ-ਪੁਲਿੰਗ, ਇਕ ਵਚਨ-ਬਹੁ ਵਚਨ; ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ; ਖਾਣ-ਪੀਣ ਅਤੇ ਸਾਕਾਦਾਰੀ ਨਾਲ ਸੰਬੰਧਿਤ।

B.Sc. AGRICULTURE (HONS.) Semester – I

ਅੰਕ–ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ:

1. ਪਹਿਲੇ ਯੂਨਿਟ ਵਿੱਚੋਂ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀ ਬਣਤਰ ਅਤੇ ਤਰਤੀਬ ਨਾਲ ਸਬੰਧਿਤ 5-5 ਅੰਕਾਂ ਦੇ ਚਾਰ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇਕ-ਇਕ ਜਾਂ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ।
2. ਦੂਜੇ ਯੂਨਿਟ ਵਿੱਚੋਂ ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫ਼ੀ ਅਤੇ ਉਚਾਰਨ ਨਾਲ ਸਬੰਧਿਤ 5-5 ਅੰਕਾਂ ਦੇ ਤਿੰਨ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇਕ-ਇਕ ਜਾਂ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ।
3. ਤੀਜੇ ਯੂਨਿਟ ਵਿੱਚੋਂ ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ ਨਾਲ ਸਬੰਧਿਤ 5-5 ਅੰਕਾਂ ਦੇ ਦੋ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇਕ-ਇਕ ਜਾਂ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ।
4. ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਨਾਲ ਸਬੰਧਿਤ ਇਕ-ਇਕ ਅੰਕ ਦੇ ਪੰਜ (ਆਬਜੈਕਟਿਵ) ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
5. ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਭਾਸ਼ਾ ਸਰਲ ਅਤੇ ਸਪਸ਼ਟ ਰੱਖੀ ਜਾਵੇ।

B.Sc. AGRICULTURE (HONS.) Semester – II

Agron. 106: Water Management and Micro Irrigation

Time: 3 Hours **Max. Marks: 75**
Theory: 50
Practical: 25
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

Irrigation- 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. AGRICULTURE (HONS.) Semester – II

CSE 101: Introduction to Computer Application

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

Instructions for the Paper Setters:

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

Theory

Introduction, anatomy and classification of computers. Input and output devices. Units of memory. Hardware and software. Types of processors. Booting of computer. Computer viruses, worms and vaccines and security system. Operating system- Disk Operating System (DOS), WINDOWS and Linux. Basic DOS commands. WINDOWS- Graphical User Interface (GUI), desktop and its elements. Windows Explorer. Anatomy of a window, title bar, minimum, maximum and close buttons. Scroll bars, menus and toolbars. Internet- World Wide Web (WWW)- Concepts, web browsing and electronic mail.

Practical

Applications- MS Office- MSWORD- Word processing and units of document, features of word-processing packages. Creating, editing, formatting and saving a document in MS WORD. MS EXCEL- electronic spreadsheets, concept, packages. Creating, editing and saving a spreadsheet. Use of basic in-built statistical and other functions and writing expressions. Use of data analysis tools, correlation and regression, t-test for two-samples with one-way classification. Creating graphs. MS POWER POINT- Features of Power Point Package. MSACCESS- Concept of database. Units of database. Creating database- Illustration through examples.

B.Sc. AGRICULTURE (HONS.) Semester – II

Ext. 101: Dimensions of Agricultural Extension

Time: 3 Hours **Max. Marks: 75**
Theory: 50
Practical: 25
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

Education- meaning and types. Extension Education and Agricultural Extension- meaning, objectives, principles and philosophy. Importance and problems of rural development. Agricultural and rural development programmes of pre and post independence era. Powers, functions and organizational set-up of three tier Panchayati Raj System. New trends in extension education and privatization of extension. Women development programmes. Emergence of broad based extension.

Practical

Visit to Village Farmer's Club, Cooperative Agricultural Service Society, Panchayati Raj Institutions, District Rural Development Agency, Self Help Groups and Voluntary Organization. Identification of the agricultural problems using Participatory Rural Appraisal Techniques.

B.Sc. AGRICULTURE (HONS.) Semester – II

PBG 103: Principles of Genetics

Time: 3 Hours **Max. Marks: 75**
Theory: 50
Practical: 25
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

Mendel's laws of inheritance. Types of gene action. Qualitative and quantitative traits. Multiple factor hypothesis. Cytoplasmic inheritance. Mutations - methods of inducing mutations and detection of sex linked and autosomal mutations. ClB technique. Gene expression and differential gene activation, Lac operon and fine structure of gene. Ultra structure of cell and cell organelles and their functions. Study of chromosome structure, morphology, number and types. Karyotype and Idiogram, Mitosis and meiosis. DNA and its structure, function, types, modes of replication and repair. RNA and its structure, function and types. Transcription. Translation - genetic code and outline of protein synthesis. Crossing over and factors affecting it. Mechanism of crossing over and cytological proof of crossing over. Linkage and estimation of linkage. Numerical chromosomal aberrations and evolution of different crop species like cotton, wheat, tobacco**,** triticale and *Brassicas*. Structural chromosomal aberrations.

Practical

Microscopy. Preparation and use of fixatives and stains for light microscopy. Identification of various stages of mitosis and meiosis. Monohybrid, Dihybrid and Trihybrid ratios and their modifications. Chi-square analysis and Interaction of factors. Epistatic factors, additive factors and Inhibitory factors. Linkage- two point and three point test cross. Induction of polyploidy using colchicines. Induction of chromosomal aberrations using chemicals.

B.Sc. AGRICULTURE (HONS.) Semester – II

Soils 104: Soil Chemistry, Soil Fertility and Nutrient Management

Time: 3 Hours **Max. Marks: 75**
Theory: 50
Practical: 25
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 source of plant nutrients. Essential and beneficial elements- criteria of essentiality, forms of nutrients in soil, mechanisms of nutrient transport to plants. Factors affecting nutrient availability to plants. Measures to overcome deficiencies and toxicities. Problem soils- acid, salt affected and calcareous soils, characteristics, nutrient availabilities, Reclamation- mechanical, chemical and biological methods. Fertilizer and insecticides and their effect on soil, water and air. Irrigation water- quality of irrigation water and its appraisal. Soil fertility- approaches for soil fertility evaluation. Methods of soil testing. Critical levels of different nutrients in soil. Plant analysis- DRIS approach, critical levels in plants. Rapid tissue tests. Indicator plants. Biological methods of soil fertility evaluation. Soil test based fertilizer recommendations to crops. Factors influencing nutrient use efficiency (NUE) in respect of N, P, K, S, Fe and Zn fertilizers. Source, method and scheduling of nutrients for different soils and crops grown under rainfed and irrigated conditions.

Practical

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

B.Sc. AGRICULTURE (HONS.) Semester – II

Veg. 101: Vegetable Production Technology

Time: 3 Hours **Max. Marks: 75**
Theory: 50
Practical: 25
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 Olericulture. Vegetable gardens. Vegetable origin, classification, area, production and varieties. Package of practices of tomato, brinjal, chillies and okra. Cucurbitaceous vegetables-- cucumber, ridge gourd, ash gourd, snake gourd, bottle gourd, bitter gourd and melons. Cole crops - cabbage, cauliflower and knol-khol. Bulb crops - onion and garlic. Beans and peas - French beans, cluster beans, dolichos beans, peas and cowpea. Tuber crops - potato, sweet potato, tapioca, colocasia, yams. Root crops - carrot, radish, turnip and beet root. Leafy vegetables - amaranthus, palak, methi. Perennial vegetables - drumstick, coccinia and curry leaf.

Practical

Planning and layout of kitchen garden. Identification of important vegetable seeds and plants. Raising of vegetable nurseries. Transplanting of vegetable seedlings in main field. Layout of kitchen garden and maintenance. Seed extraction in tomato and brinjal. Visit to commercial vegetable farms. Intercultural operations in vegetable plots. Sowing of potato, solanaceous fruit crops, root crops and cucurbitaceous vegetables. Seed production in vegetable crops. Harvesting indices of different vegetable crops. Grading and packing of vegetables.

B.Sc. AGRICULTURE (HONS.) Semester – II

Zoo. 103: Basic Zoology

Time: 3 Hours **Max. Marks: 50**
Theory: 25
Practical: 25
Periods per week 2+2

Instructions for the Paper Setters:

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

Theory

Cell structure, cell division, biomolecules. Simple and compound tissues. Functional organization of various systems of a mammal. Gametogenesis and development of frog up to three germinal layers. Binomial nomenclature, classification and general survey of animal kingdom. Common ecto and endoparasites of man and domestic animals.

Practical

Study of cell structure and cell division. Microscopic study of histological preparations of simple and compound tissues. Anatomy of a mammal. Slides of frog development. General survey of animal kingdom up to classes.

B.Sc. AGRICULTURE (HONS.) Semester – II

Math. 108: Basic Mathematics-II

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

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

Definition of function. Limit. Continuity. Differentiation, successive differentiation, geometrical interpretation of derivative. Indefinite integration, integration by substitution. Partial fractions and their use in integration. Integration by parts.

B.Sc. AGRICULTURE (HONS.) Semester – II

COMMUNICATION SKILLS IN ENGLISH
(For Colleges (Regular & Private))

Time: 3 Hours **Max. Marks: 50**
Theory Marks: 35
Practical Marks: 15

Course Contents:

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

   Activities:
   a) Listening exercises – Listening to conversation, News and TV reports
   b) Taking notes on a speech/lecture

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.
   The study of sounds of English, stress and intonation
   Situation based Conversation in English
   Essentials of Spoken English

   Activities:
   a) Making conversation and taking turns
   b) Oral description or explanation of a common object, situation or concept
   c) Giving interviews

Suggested Pattern of Question Paper:
The question paper will consist of seven questions related to speaking and listening Skills. Each question will carry 5 marks. The nature of the questions will be as given below:

Two questions requiring students to give descriptive answers.

Three questions in the form of practical exercise requiring students to give an appropriate response to a question, a proposal, a proposition, an invitation etc. For Example, the paper setter may give a proposition and ask the students to agree or disagree with it or introduce a character giving invitation and ask the students to accept or refuse it etc.

Two questions requiring students to transcribe simple words in IPA symbols, marking stress and marking intonation.

Practical /Oral Testing

Marks: 15

Course Contents:
1. Oral Presentation with/without audio visual aids.
2. Group Discussion.
3. Listening to any recorded or live material and asking oral questions for listening comprehension.

Questions:
1. Oral Presentation will be of 5 to 10 minutes duration. (Topic can be given in advance or it can be of student's own choice). Use of audio visual aids is desirable.
2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20 minutes.

Note: Oral test will be conducted by external examiner with the help of internal examiner.

B.Sc. AGRICULTURE (HONS.) Semester – II

ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)

ਸਮਾਂ : 3 ਘੰਟੇ **ਕੁਲ ਅੰਕ : 50**

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਗਿਆਨ ਮਾਲਾ** (ਵਿਗਿਆਨਕ ਤੇ ਸਮਾਜ-ਵਿਗਿਆਨਕ ਲੇਖਾਂ ਦਾ ਸੰਗ੍ਰਹਿ)
   (ਸੰਪ. ਡਾ. ਸਤਿੰਦਰ ਸਿੰਘ, ਪ੍ਰੋ. ਮਹਿੰਦਰ ਸਿੰਘ ਬਨਵੈਤ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ, 2007
   ਲੇਖ : ਸਾਹਿਤ ਤੇ ਲੋਕ ਸਾਹਿਤ, ਅੱਖਾਂ, ਅਚੇਤਨ ਦਾ ਗੁਣ ਤੇ ਸੁਭਾਅ, ਕੰਪਿਊਟਰ ਅਤੇ ਇੰਟਰਨੈੱਟ, ਮਨੁੱਖੀ ਅਧਿਕਾਰ।
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, ਮੁੱਢਲੇ 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 ਨਿਬੰਧ ਦਾ ਸਾਰ ਜਾਂ ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ (ਦੋ ਵਿਚੋਂ ਇਕ) ।	10 ਅੰਕ
2.	ਵਾਰਤਕ ਰੂਪ : ਰੇਖਾ ਚਿਤਰ, ਨਾਇਕ ਬਿੰਬ, ਕਲਾਤਮਕ ਗੁਣ, ਰੇਖਾ ਚਿਤਰ ਸਾਹਿਤ ਨੂੰ ਦੇਣ	10 ਅੰਕ
3-4.	3-4 ਨੰਬਰ ਉੱਤੇ ਦਿੱਤੀ ਵਿਆਕਰਣ ਦੇ ਆਧਾਰ ਤੇ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ।	10 ਅੰਕ
5.	ਪੈਰ੍ਹਾ ਰਚਨਾ : ਤਿੰਨ ਵਿਸ਼ਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਇਕ ਉਤੇ ਪੈਰ੍ਹਾ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇ ।	05 ਅੰਕ
6.	ਪੈਰ੍ਹਾ ਦੇ ਕੇ ਉਸ ਬਾਰੇ ਪੰਜ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ	05 ਅੰਕ
7.	ਨੰਬਰ 7 ਵਿਚ ਅੱਠ ਅਖਾਣ ਅਤੇ ਅੱਠ ਮੁਹਾਵਰੇ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਪੰਜ-ਪੰਜ ਨੂੰ ਵਾਕਾਂ ਵਿਚ ਵਰਤ ਕੇ ਅਰਥ ਸਪੱਸ਼ਟ ਕਰਨੇ ਹੋਣਗੇ ।	5+5= 10 ਅੰਕ

B.Sc. AGRICULTURE (HONS.) Semester – II

ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(In lieu of Compulsory Punjabi)
ਪਾਠ–ਕ੍ਰਮ

ਸਮਾਂ: ਤਿੰਨ ਘੰਟੇ **ਕੁੱਲ ਅੰਕ: 50**

ਪੰਜਾਬੀ ਸ਼ਬਦ–ਬਣਤਰ
ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ
ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ 20 ਅੰਕ

ਪੰਜਾਬੀ ਵਾਕ–ਬਣਤਰ
ਸਾਧਾਰਨ ਵਾਕ : ਕਿਸਮਾਂ
ਸੰਯੁਕਤ ਵਾਕ : ਕਿਸਮਾਂ
ਮਿਸ਼ਰਤ ਵਾਕ : ਕਿਸਮਾਂ
ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਰਤੋਂ ਦੇ ਵਿਭਿੰਨ ਸਮਾਜਿਕ ਪ੍ਰਸੰਗ 15 ਅੰਕ

ਪ੍ਰਕਾਰਜੀ ਪੰਜਾਬੀ
ਚਿੱਠੀ ਪੱਤਰ
ਪੈਰਾ ਰਚਨਾ
ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ 15 ਅੰਕ

ਯੂਨਿਟ ਅਤੇ ਥੀਮ:

ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ: ਸੰਯੁਕਤ ਸ਼ਬਦ ; ਸਮਾਸੀ ਸ਼ਬਦ (ਜਿਵੇਂ ਲੋਕ ਸਭਾ) ; ਦੋਹਰੇ ਸ਼ਬਦ/ਦੁਹਰੁਕਤੀ (ਜਿਵੇਂ ਧੂੜ ਧਾੜ/ਭਰ ਭਰ), ਮਿਸ਼ਰਤ ਸ਼ਬਦਾਂ ਦੀ ਬਣਤਰ/ਸਿਰਜਨਾ; ਅਗੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਉਪ–ਭਾਸ਼ਾ), ਪਿਛੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਰੰਗਲਾ), ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ; ਪੜਨਾਵੀਂ ਰੂਪ, ਕਿਰਿਆ/ਸਹਾਇਕ ਕਿਰਿਆ ਦੇ ਰੂਪ ; ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ; ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਮੌਸਮਾਂ, ਗਿਣਤੀ ਨਾਲ ਸਬੰਧਿਤ।

ਪੰਜਾਬੀ ਵਾਕ–ਬਣਤਰ : ਕਰਤਾ ਕਰਮ ਕਿਰਿਆ; ਸਾਧਾਰਨ ਵਾਕ, ਬਿਆਨੀਆ, ਪ੍ਰਸ਼ਨਵਾਚਕ, ਆਗਿਆਵਾਚਕ; ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਵਾਕਾਂ ਦੀਆਂ ਕਿਸਮਾਂ ; ਸੁਤੰਤਰ ਅਤੇ ਅਧੀਨ ਉਪਵਾਕ ; ਸਮਾਨ (ਤੇ/ਅਤੇ) ਅਤੇ ਅਧੀਨ (ਜੋ/ਕਿ) ਯੋਜਕਾਂ ਦੀ ਵਰਤੋਂ ; ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਰਤੋਂ ਦੇ ਵਿਭਿੰਨ ਸਮਾਜਕ/ਸਭਿਆਚਾਰਕ ਪ੍ਰਸੰਗ ; ਘਰ ਵਿਚ, ਬਾਜ਼ਾਰ ਵਿਚ, ਮੇਲੇ ਵਿਚ, ਸ਼ੌਪਿੰਗ ਮਾਲ/ਸਿਨਮੇ ਵਿਚ, ਵਿਆਹ ਵਿਚ, ਧਾਰਮਿਕ ਸਥਾਨਾਂ ਵਿਚ, ਦੋਸਤਾਂ ਨਾਲ ਆਦਿ।

ਇਸ ਯੂਨਿਟ ਵਿਚ ਚਿੱਠੀ ਪੱਤਰ (ਨਿੱਜੀ/ਦਫ਼ਤਰੀ), ਪੈਰਾ ਰਚਨਾ ਅਤੇ ਅਖਾਣ ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਦੀ ਭਾਸ਼ਾਈ ਯੋਗਤਾ ਨੂੰ ਪਰਖਿਆ ਜਾਵੇਗਾ।

B.Sc. AGRICULTURE (HONS.) Semester – II

ਅੰਕ–ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ:

ਪਹਿਲੇ ਯੂਨਿਟ ਵਿੱਚੋਂ ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ ਨਾਲ ਸਬੰਧਿਤ 5–5 ਅੰਕਾਂ ਦੇ ਤਿੰਨ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇਕ–ਇਕ ਜਾਂ ਦੋ–ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ।

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਸ਼ਬਦਾਵਲੀ ਨਾਲ ਸਬੰਧਿਤ ਇਕ–ਇਕ ਅੰਕ ਦੇ ਪੰਜ (ਆਬਜੈਕਟਿਵ) ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

ਦੂਜੇ ਯੂਨਿਟ ਵਿੱਚ ਪੰਜਾਬੀ ਵਾਕ–ਬਣਤਰ ਨਾਲ ਸਬੰਧਿਤ 5–5 ਅੰਕਾਂ ਦੇ ਦੋ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇਕ–ਇਕ ਜਾਂ ਦੋ–ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ।

ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਿਹਾਰਕ ਵਰਤੋਂ ਨਾਲ ਸਬੰਧਿਤ 5 ਅੰਕਾਂ ਦਾ ਇਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛਿਆ ਜਾਵੇਗਾ ਜਿਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਨੂੰ ਕਿਸੇ ਸਮਾਜਿਕ/ਸਭਿਆਚਾਰਕ ਪ੍ਰਸੰਗ ਵਿਚ ਵਰਤੇ ਜਾਂਦੇ ਪੰਜ ਵਾਕ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇਗਾ।

ਵਿਦਿਆਰਥੀ ਨੂੰ ਕਿਸੇ ਇਕ ਵਿਸ਼ੇ 'ਤੇ ਨਿੱਜੀ ਜਾਂ ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇਗਾ।

ਵਿਦਿਆਰਥੀ ਨੂੰ ਕਿਸੇ ਇਕ ਵਿਸ਼ੇ 'ਤੇ ਪੈਰਾ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇਗਾ।

ਵਿਦਿਆਰਥੀ ਨੂੰ ਇਕ–ਇਕ ਅੰਕ ਦੇ ਪੰਜ ਅਖਾਣਾਂ ਜਾਂ ਮੁਹਾਵਰਿਆਂ ਨੂੰ ਵਾਕਾਂ ਵਿਚ ਵਰਤ ਕੇ ਅਰਥ ਸਪਸ਼ਟ ਕਰਨ ਲਈ ਕਿਹਾ ਜਾਵੇਗਾ।

ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਭਾਸ਼ਾ ਸਰਲ ਅਤੇ ਸਪਸ਼ਟ ਰੱਖੀ ਜਾਵੇ।

Agron. 203 Principles of Agronomy-I *(Kharif Corps*)

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

Theory= 50

Practical = 25

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.

Agron. 203 Principles of Agronomy-I (*Kharif Crops*)

Meaning and scope of Agronomy. Tillage and crops stand establishment. Planting geometry and its effect on growth and yield. Cropping systems. Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of *kharif* crops-rice, maize, sorghum, pearl millet, minor millets, pigeonpea, mungbean, urdbean, groundnut, sesame, soybean, cotton, jute , sunhemp and forage crops -sorghum, maize, cowpea, cluster bean and napier.

Practical: Study of tillage implements. Practice of ploughing and puddling. Seed bed preparation, sowing, fertilizer application, nursery raising and transplanting of *Kharif* crops. Calculations of seed rate. Effect of seed size and sowing depth on germination. Identification of weeds of *Kharif* crops. Fertilizer experiments on rice, maize, sorghum and millets. Study of yield components. Study of crop varieties and important agronomic experiments. Study of forage crops.

B.Sc. AGRICULTURE (HONS.) Semester – III

Bot. 206 Crop Physiology

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.**

Bot. 206 Crop Physiology

Introduction and Importance of crop physiology in agriculture, Seed Structures, Morpho-Physiological and Biochemical Changes during Seed Development. Physiological and Harvestable Maturity. Seed Germination and Seed Dormancy. Growth and Development. Crop water Relations. Transpiration and its Significance in Relation to Crop Productivity. Water use efficiency, Significance of C_3, C_4 and CAM Pathways, Photorespiration. Photosynthesis and Crop Productivity, Translocation of Assimilates, Source and Sink Concept. Respiration its Types and Significance. Mineral Nutrition, Physiology of nutrient uptake, deficiency and toxicity symptoms and hydroponics. Photoperiodism and vernalisation, Plant growth regulators-occurrence, biosynthesis, mode of action and commercial applications. Senescence and abscission. Fruit ripening and its hormonal regulation.

Practical: Seed Structure, Germination and Seed Dormancy. Growth Analysis. Calculation of Growth Parameters, Methods of measuring water status in roots, stems and leaves. Measurement of water potential. Absorption spectrum of chloroplastic pigments. Transpiration, Photosynthesis and Respiration. Stomatal Frequency and Index. Deficiency Symptoms of Nutrients. Leaf Anatomy of C_3 and C_4 plants.

B.Sc. AGRICULTURE (HONS.) Semester – III

Ent. 204 Fundamentals of Insect Morphology and Systematics

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.

Ent. 204 Fundamentals of Insect Morphology and Systematics

Entomology- definition and its history. Factors for insect abundance. Integument, moulting, body regions and segmentation. Morphology and anatomy of an insect (Grasshopper/Blister beetle). Modification and function of mouth parts, antennae, legs and wings. Wing venation and wing coupling apparatus. Sense organs. Metamorphosis and diapause. Types of reproduction. Taxonomy- its importance, history, development and binomial nomenclature. Definitions of biotype, sub-species, species, genus, family and order. Classification of class Insecta upto orders, suborders and important families with special emphasis on distinguishing morphological characters.

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

B.Sc. AGRICULTURE (HONS.) Semester – III

Ext.201 Extension Methodologies and Communication Skills for Transfer of Technology

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.

Ext.201 Extension Methodologies and Communication Skills for Transfer of Technology
Meaning, nature, importance, elements, models and barriers in communication. Extension programme planning. Principles and steps in programme development process. Monitoring and evaluation of extension programmes. Extension teaching methods and factors influencing their selection and use. Combination (Media Mix) of teaching methods. Innovative information sources. Audio – visual aids; selection, preparation, use and evaluation. Meaning, scope and importance of agricultural journalism. Diffusion and adoption of innovations. Models of adoption process. Factors influencing adoption process. Capacity building of extension personnel and farmers. Communication skills for effective transfer of technology. Organizing seminars and conferences.

Practical: Simulated exercises on communication. Developing a project based on identified problems in a selected village. Organization of group discussion and method demonstration. Visit to Krishi Vigyan Kendra. Planning and script writing for radio and television talks. Planning and preparation of visual aids and agricultural information materials. Handling of public address system.

B.Sc. AGRICULTURE (HONS.) Semester – III

FPM 202: Farm Power and Machinery

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

Theory= 50

Practical = 25

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.

FPM 202 Farm Power and Machinery

Farm power in India-sources. Internal Combustion (IC) Engines and Terminology. Working Principles of Two Stroke and Four Stroke Engines. Different Systems of Tractors, Types and Selection. Primary and Secondary Tillage Implements. Implements for Intercultural Operations, Seed Drills, Paddy Transplanters their Calibrations. Plant Protection, Harvesting and Threshing Equipment. Cost of Operation of Tractor and Machinery.

Practical: Study of different components of IC engine, working of two stroke and four stroke engines. Various systems of tractors. Study of Mould Board (MB) plough, measurement. Plough size, different parts, horizontal and vertical suction. Disc plough. Seed-cum-fertilizer drills, furrow opener, metering mechanism and calibration. Study of different part, alignment and operation of mowers. Registration procedures, Study of different inter cultivation equipments. Paddy transplanters and threshing systems. Repair, adjustment and operation of sprayers and dusters.

B.Sc. AGRICULTURE (HONS.) Semester – III

Soils 204 Manures and Fertilizers

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

Periods per week 4

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.

2. The language of questions should be straight & simple.

3. Not more than one question should be based on one topic.

4. The question paper should cover the whole syllabus and questions should be evenly distributed.

5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Soils 204 Manures and Fertilizers

Fertilizers – classification, manufacturing processes and properties of major nitrogenous (ammonium sulphate, urea, calcium ammonium nitrate, ammonium nitrate, ammonium sulphate nitrate), phosphatic (single super phosphate, enriched super phosphate, diammonium phosphate, ammonium poly phosphate), potassic and complex fertilizers, their fate and reactions in the soil. Secondary and micronutrient fertilizers and amendments. Fertilizer Control Order. Fertilizer storage. Biofertilizers and their advantages. Manures - bulky and concentrated, Farm Yard Manure. Composting – different methods, mechanical compost plants, vermicomposting, green manuring, oil cakes. Sewage and sludge – biogas plant slurry, plant and animal refuges.

B.Sc. AGRICULTURE (HONS.) Semester – III

Hort. 203 Production Technology of Fruit Crops

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.

Hort. 203 Production Technology of Fruit Crops

Definition, importance and divisions of horticulture. Climatic zones, area and production of different fruit crops. Selection of site, fencing and wind break. Planting systems, high density planting, planning and establishment. Propagation methods and use of rootstocks. Methods of training and pruning. Use of growth regulators in fruit production. Package of practices for the cultivation of – Major fruits –mango, banana, citrus, grapes, guava, sapota, apple, litchi and papaya. Minor fruits – pineapple, annonaceous fruits, pomegranate, ber, fig, loquat, phalsa, jackfruit, pear, plum, peaches, apricot and cherry.

Practical: Horticultural tools and their uses. Containers and potting mixtures. Plant and seed propagation, scarification, and stratification. Layout and planting systems. Methods of pruning and training. Training of ber, grape and pomegranate. Pruning of ber, grape, phalsa, fig, apple, pear, peach. Identification of important species and varieties of fruits. Irrigation methods including drip and micro irrigation. Methods of fertilizer application. Preparation of growth regulators, powder, solution and lanolin paste for propagation. Application of growth regulators for improving fruit set, fruit size, quality, delaying and hastening ripening. Visit to local commercial orchards.

B.Sc. AGRICULTURE (HONS.) Semester – III

Soil 203 Soil Physics and Erosion Management

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.

Soils 203 Soil Physics and Erosion Management

Soil – a water reservoir, role in water cycle. Computation of depletion and accretion of profile water. Forces of water retention. Soil water potential - components and distribution above and below water table. Soil-plant-atmosphere continuum, Indices of plant water status. Soil moisture characteristics, Evaporation in the presence and absence of water table, Components of water balance and their computation. Soil erosion by water – types, effects, mechanics. Rain erosivity and soil erodibility. Runoff – methods of measurement, factors and management, runoff farming. Soil conservation measures.

Practical: Measurement and analysis of rainfall data. Determination of soil moisture, infiltration and drainage characteristics in the field. In situ determination of soil moisture by neutron probe and tensiometery. Soil moisture characteristics. Advancement of wetting front in homogeneous and layered soil columns. Measurement of soil evaporation under differential surface conditions. Estimation of erosivity and erodibility indices. Measurement and estimation of runoff and soil loss.

B.Sc. AGRICULTURE (HONS.) Semester – III

Pl. Path. 201 Plant Pathogens and Principles of Plant Pathology

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.

Pl. Path. 201 Plant Pathogens and Principles of Plant Pathology

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, Peronosclerospora, Pseudoperonospora, Peronospora, Plasmopara, Bremia, Mucor, Rhizopus, Oidium, Erysiphe, Phyllactinia, Uncinula, Podosphaera, Puccinia, Uromyces, Hemileia, Sphacelotheca, Ustilago, Tolyposporium, Agaricus, Pleurotus, Ganoderma, Septoria, Colletotrichum, Pestalotia, Pyricularia, Aspergillus, Penicillium, Trichoderma, Fusarium, Drechslera, Alternaria, Stemphyllium, Cercospora, Phaeoisariopsis, Rhizoctonia, Sclerotinia, Xanthomonas, Pseudomonas, Meloidogyne* and *Anguina* . 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. AGRICULTURE (HONS.) Semester – III

ESL-221 ENVIRONMENTAL STUDIES-I

Theory Lectures: 1.5 Hours/ Week **Max. Marks: 50**

Time of Examination: 3 Hours

Section A (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying five marks. Answer to any of the questions should not exceed two pages.

Section B (20 Marks): It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying ten marks. Answer to any of the questions should not exceed four pages.

Section C (15 Marks): It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages.

1. **The multidisciplinary nature of environmental studies:**

- Definition, scope & 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 recourses: 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 the following ecosystems:
  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 Act:
  - 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.

References/Books:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar.
10. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

B.Sc. AGRICULTURE (HONS.) Semester – IV

Agron. 204 Principles of Agronomy- II (*Rabi Crops*)

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

Theory= 50

Practical = 25

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.

Agron. 204 Principles of Agronomy –II (*Rabi Crops*)

Origin, geographic distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *rabi* crops- wheat, barley, chickpea, lentil, peas, french bean, rapeseed and mustard, sunflower, safflower, linseed, sugarcane, sugarbeet, potato, tobacco and forage crops- berseem, lucerne and oats. National and International Agricultural Research Institutes in India.

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

B.Sc. AGRICULTURE (HONS.) Semester – IV

Econ. - 202 Production Economics, Farm Management and Agricultural Finance

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.

Econ. - 202 Production Economics, Farm Management and Agricultural Finance

Agricultural Production Economics– 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 Finance– Nature and Scope, Compounding and Discounting. Agricultural Credit– Meaning, Definition, Need and Classification. Credit Appraisal, History of Financing Agriculture in India. Agricultural Financial Institutions. Assessment of Crop Losses. Determination of Compensation. Crop Insurance. Agricultural Cooperation- Philosophy and Principles. History of Indian Co-operative movement. Co-operative Credit Structure. Reorganization of Co-operative Credit Structure and Single Window System.

Practical: Methods of Depreciation. Analysis of Net-Worth Statement. Farm Inventory Analysis- Preparation of Farm Plants and Budgets, Profit and Loss Account. Break-Even Analysis. Economic Analysis of different crop and livestock enterprises. Compounding and Discounting. Preparation of Balance Sheet, income statement and cash flow analysis. Estimation of Credit Needs. Determination of Unit Costs. Preparation and analysis of Loan Proposals.

Ent. 205- Insect Ecology and Integrated Pest Management

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.

Ent. 205 -Insect Ecology and Integrated Pest Management

Insect Ecology- Introduction, environment and its components, effect of abiotic and biotic factors. Biotic potential, environmental resistance and causes for pest outbreaks in agro-ecosystem. Pest surveillance and pest forecasting. Categories of pests. Host plant resistance, cultural, mechanical, physical, legislative and biological control. Chemical control- importance, hazards and limitations. IPM its tools and limitations. Classification, toxicity and formulations of insecticides. Study of important insecticides- botanical, organophosphates, carbamates, synthetic pyrethroids. Novel insecticides, pheromones, nicotinyl, chitin synthesis inhibitors, phenyl pyrazoles, avermectins, macrocyclic lactones, oxadiazines, thiourea derivatives, pyridine azomethines, pyroles, etc., rodenticides, acaricides and fumigants. Recent methods of pest control. Insecticides Act 1968. Symptoms of poisoning, first aid and antidotes. Beneficial insects. Important species of pollinators, weed killers and scavengers, their importance. Non insect pests- mites, rodents and birds.

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.

Ext.202 Fundamentals of Rural Sociology and Educational Psychology

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

Periods per week 4

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.

2. The language of questions should be straight & simple.

3. Not more than one question should be based on one topic.

4. The question paper should cover the whole syllabus and questions should be evenly distributed.

5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Ext.202 Fundamentals of Rural Sociology and Educational Psychology

Introduction and importance of rural sociology in agricultural extension. Indian rural society. Social groups. Factors in formation and organization of groups. Motivation in group formation and role of social groups in agricultural extension. Social stratification. Class, caste system, culture, customs, folkways, mores, taboos, rituals, traditions, social values and attitudes – meaning and role in agricultural extension. Functions and role of social institutions. Social organizations. Social control, social change and their factors. Leadership, different methods of identification of leaders and their training. Scope and importance of educational psychology. Intelligence and personality. Teaching- learning process. Principles of learning and their implications for teaching.

LPM 205 Livestock Production and Management

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

Theory= 50

Practical = 25

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.

LPM 205 Livestock Production and Management

Place of livestock in the national economy. Livestock development programmes of Govt. of India and State Govt. Important exotic and Indian breeds of cattle, buffalo, sheep, goat and swine. Measures and factors affecting fertility in livestock. Reproductive behaviour, estrous cycle, detection of estrous, Artificial Insemination (AI), pregnancy and parturition in various livestock species. Care of pregnant animal and new born young one. Physiology of milk secretion and different milking methods. Factors affecting milk yield and composition. Selection procedure and various systems of breeding in livestock. Feeding management of calves, heifers, pregnant and milch animals. Feeding and management of sheep, goat and swine. Housing principles for livestock. Vaccination and prevention of important diseases of livestock and poultry. Important breeds of poultry, egg formation, abnormal eggs and factors affecting egg size. Moulting, incubation, hatching and brooding. Housing, breeding, feeding and management of poultry. Biotechnological interventions in animal production and reproduction.

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

B.Sc. AGRICULTURE (HONS.) Semester – IV

PBG 202 Principles of Seed Technology

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.

PBG 202 Principles of Seed Technology

Importance of seed production. Certified, Foundation and Breeder seed production. Maintenance of genetic purity. Seed quality and classes of seed. Maintenance and multiplication of pre-release and newly released varieties of self and cross-pollinated crops.
Seed production in maize, bajra and sorghum (varieties, hybrids, synthetics and composites), Rice(varieties and hybrids) castor, tomato, brinjal, chillies, bhindi, onion. Bottle Gourd and Ridge gourd. Seed certification. Seed Act and its Enforcement. Intellectual property Rights. Patenting, WTO, Plant Breeders Rights, Principles and Methods of seed drying. Seed processing. Planning And Layout Of Seed Processing Plant. Different upgrading equipments and their use. Seed testing procedures for quality assessment. Seed treatment and its importance. Seed packing and storage. Seed marketing and organzational set up.
Practical: Seed sampling principles and procedures. Determination of physical purity, germination, moisture, viability, seed health and seed vigour of field and horticultural crops. Seed dormancy and breaking methods. Grow-out tests and electrophoresis for varietal identification. Visit to seed production plots, testing laboratories, processing plants, grow-out testing farms and hybrid seed production farms.

Pl. Path. 202 Diseases of Field Crops and their Management

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.

Pl. Path. 202 Diseases of Field Crops and their Management

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. AGRICULTURE (HONS.) Semester – IV

Agron. 205 Organic Farming

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.

Agron. 205 Organic Farming
(In collaboration with Department of Soil Science, Entomology and Plant Pathology)

Organic farming- introduction, concept, relevance in the present context. Organic production requirements. Biological intensive nutrient management. Recycling of organic residues. Soil improvement and amendments. Integrated diseases and pest management. Use of biocontrol agents, biopesticides, pheromones, trap crops and bird perches. Weed management. Quality considerations - certification, labeling and accreditation processors, marketing and exports.

Practical: Raising of vegetable crops through organic sources. Diseases and pest management. Vermicomposting. Vegetable and ornamental nursery raising. Macro quality analysis. Grading, packaging and post harvest management.

SWE 101 Fundamentals of Soil and Water Conservation Engineering

Time: 3 Hours **Max. Marks: 75**
Theory= 50
Practical = 25
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.

SWE 101 Fundamentals of Soil and Water Conservation Engineering

Surveying– Survey Equipments, Chain Survey. Plotting Procedure. Calculations of area of Regular and Irregular Fields. Levelling– Equipment, Terminology, Methods of calculation. Types of Levelling and Contouring. Irrigation– Classification of Projects, Flow Irrigation and Lift Irrigation. Water Sources. Water Lifting Devices– Pumps their Capacity and Power Calculation. Irrigation Water Measurement– Weirs, Flumes and Orifices. Water Conveyance Systems–Open Channel and Underground Pipeline. Surface, Drip and Sprinkler Irrigation Methods. Soil and Water Conservation, Soil Erosion, Types and Control Measures.

Practical: Acquaintance with Chain Survey Equipment. Ranging and Measurement of offsets. Chain Triangulation and Plotting. Levelling Equipment. Differential Levelling. Profile Levelling. Contour Survey and Plotting. Study of Centrifugal Pumping System and Irrigation Water Measuring Devices. Surface Irrigation Methods. Study of different components of sprinkler and Drip Irrigation Systems. Uniformity of Water Application in Drip and Sprinkler Systems. Study of Soil and Water Conservation Measures.

ESL-222: ENVIRONMENTAL STUDIES-II

Theory Lectures: 1.5 Hours/ Week **Max. Marks: 50**

Time of Examination: 3 Hours

Section A (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying five marks. Answer to any of the questions should not exceed two pages.

Section B (20 Marks): It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying ten marks. Answer to any of the questions should not exceed four pages.

Section C (15 Marks): It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 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 the environment

- Population growth, variation among nations.
- Population explosion-Family welfare programme.
- Environment and human health.
- Human rights.
- Value education.
- HIV/AIDS.
- Women and child welfare.
- Role of information technology in environment and human health.
- Case studies.
- Road Safety Rules & Regulations**:** Use of Safety Devices while Driving, Do's and Don'ts while Driving, Role of Citizens or Public Participation, Responsibilities of Public under Motor Vehicle Act, 1988, General Traffic Signs.
- Accident & First Aid**:** First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance.

4. Field Visits:

- 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.

References/Books:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar.
10. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Agron. 302 Practical Crop Production-I (*Kharif Crops*)

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

Practical = 20

Internal Assessment =05

P**eriods per week =3**

Agron. 302 Practical Crop Production-I (*Kharif Crops*)

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. AGRICULTURE (HONS.) Semester – V

Biotech. 310 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.

Biotech. 310 Principles of Plant Biotechnology

Concepts. History of Plant Tissue Culture and Plant Genetic Engineering. Scope and importance in crop improvement. Nutritional requirements of in-vitro cultures. Micro propagation. Anther culture. Pollen culture. Ovule culture. Embryo culture. Test tube fertilization. Endosperm culture. Somaclonal variation. Somatic embryogenesis and synthetic seed production technology. Protoplast isolation, culture, manipulation and fusion. Products of somatic hybrids and cybrids-applications in crop improvement. Genetic engineering. Restriction enzymes. Vectors for gene transfer. Gene cloning. Direct and indirect method of gene transfer. Transgenic plants and their applications. Blotting techniques. DNA finger printing. DNA based markers – RFLP, AFLP, RAPD, SSRs SNPs. DNA Probes. QTL Mapping. MAS and its application in crop improvement.

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. AGRICULTURE (HONS.) Semester – V

Chem-302 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.

Chem-302 Chemistry of Agrochemicals, Plant Products and Growth Regulators:

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

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

B.Sc. AGRICULTURE (HONS.) Semester – V

Econ-303 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.

Econ-303 Agricultural Marketing, Trade and Prices:

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. AGRICULTURE (HONS.) Semester – V

Ent. 302 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.

Ent. 302 Insect Pests of Crops and Stored Grains

Distribution, biology, symptoms of damage and management strategies of insect pests of rice, sorghum, maize, cotton, groundnut, sugarcane, ragi (*Eleucine coracana*), wheat, sunhemp, pulses, castor, safflower, sunflower, mustard, brinjal, bhindi, tomato, cruciferous and cucurbitaceous vegetables, potato, sweet potato, chillies, mango, citrus, grapevine, cashew, banana, pomegranate, guava, sapota, ber, apple, coconut, tobacco, coffee, tea, turmeric, onion, coriander, garlic, ginger and ornamental plants 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. AGRICULTURE (HONS.) Semester – V

FT 302 Introduction to Food Science and Post-Harvest Value Addition

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.

FT 302 Introduction to Food Science and Post-harvest Value Addition

Food production and consumption trends in India. Major deficiencies of calories and proteins. Food groups and concept of balanced diet. Causes of food spoilage. Principles of processing and preservation of foods by heat, low temperature, chemicals and fermentation. Preservation through ultraviolet and ionizing radiations. Post harvest handling and technology of fruits, vegetables, cereals, oilseeds, milk, egg, meat and poultry. Food safety, adulteration and food laws. Status of food industry in India.

Practical: Quality assessment of cereals, fruits, vegetables, milk, egg, meat and poultry. Value added products from cereals, fruits, vegetables, milk, egg and meat. Visit to local processing units.

B.Sc. AGRICULTURE (HONS.) Semester – V

Forst 301- Introductory 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.

Forst. 301 Introductory Forestry

Forestry – definition, scope and important terminology. Status of forests in India and their role. History of forestry development in India. National and International Forestry Organizations. Distribution of forests and their classification. Locality factors: climatic, edaphic, topographical and biotic. Tending operations. Agroforestry, farm forestry and social forestry - definition, objectives and need. Role of trees in rural economy. Choice of species w.r.t. site/economic uses and constraints of tree growing. Tree propagation and planting methods. Deforestation – forms, causes and remedial measures. Forest management: growing stock, normal forest, sustained yield, increment and rotation. Forest utilization-major and minor forest products. Forest policy and laws.

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

B.Sc. AGRICULTURE (HONS.) Semester – V

Biochem -301 Elementary 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.

Biochem.-301 Elementary Biochemistry: Introduction and importance. Plant cell. Biomolecules- structure, function and properties. Amino acids and proteins. Plant proteins and their quality. Enzymes-classification, factors affecting activity, immobilization and other industrial application. Lipids- their industrial applications. Bio-diesel Carbohydrates and nucleic acids. Bioenergetics. Metabolism- basic concepts, Glycolysis. Citric acid Cycle, Pentose phosphate pathway.Oxidative phosphorylation, fatty acid oxidation. General reaction of amino acid degradation. Biosynthesis- Carbohydrates, lipids, proteins and nucleic acids. Metabolic regulation Secondary metabolites- terpenoids, alkaloids, phenolics and their applications in food and pharmaceutical industries.

Practical: Amino acid models (Atomic) Paper electrophoresis for the separation of plant pigments. Protein denaturation. Protein estimation. Enzyme kinetics, Estimation of nucleic acids. Extraction of oil from oilseed, Characterization of lipids by Thin Layer Chromatography. Estimation of fatty acids by Gas Liquid Chromatography Models of sugars. Quantitative Determination of sugars Paper chromatography for the separation of sugars. Determination of phenols.

PBG 303 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.

PBG 303 Principles of Plant Breeding

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.

Agron. 303 Practical Crop Production-II (*Rabi Crops*)

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

Practical = 20

Internal Assessment =05

Periods per week =3

Agron. 303 Practical Crop Production-II (*Rabi Crops*)

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.

Mgt.303-Fundamentals of Agri. Business management and Entrepreneurship development

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

Theory= 40

Internal Assessment =10

Periods per week 4

Instructions for the paper setters:

1. Question paper should be set strictly according to the syllabus.

2. The language of questions should be straight & simple.

3. Not more than one question should be based on one topic.

4. The question paper should cover the whole syllabus and questions should be evenly distributed.

5. At least eight questions should be set, out of which the candidates should be required to attempt any five.

Mgt.303-Fundamentals of Agri. Business management and Entrepreneurship development:

Agri-business –meaning, definition, features and structure of agri-business (Input, Farm and processing sectors). Importance of agri-business in the Indian economy. Management-definitions importance and functions, planning-meaning, definition and process. Types of plans and characteristics of a sound plan. Introduction to organizing, staffing, directing and controlling. Introduction to marketing management-components of marketing mix. Project definitions, Project cycle-identification, formulation, appraisal, implementation , monitoring and evaluation . Entrepreneurship development-concept of entrepreneurship, entrepreneurial and managerial characteristics. Overview of Indian social, political and economic systems and their implications for decision making by individual entrepreneurs. Procedure and constraints in setting up agro – based industries.

B.Sc. AGRICULTURE (HONS.) Semester – VI

Stat.301-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.

Stat.301-Basic Statistics:

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. AGRICULTURE (HONS.) Semester – VI

EST.302-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:

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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.

EST.302-Renewable Energy:

Energy sources- Introduction and classification. Types of Biogas plants and utilization of biogas. Agricultural wastes. Principles of combustion, Pyrolysis and gasification. Types of gasifiers, producer gas and its utilization .Briquettes- briquetting machine, uses of briquittes. Solar energy- solar flat plate and focusing plate collectors. Introduction to solar air heaters, cookers, water heating systems, grain dryers, refrigeration system, ponds, lantern, street lights, fencing and pumping systems. Wind energy-types and application of wind mills. Liquid bio fuels-bio diesel and ethanol from agricultural produce and its uses.

Practical: Constructional details of biogas plant. Constructional details of different types of gasifiers. To study and find the efficiency of solar cooker, dryers, domestic water heater. Performance of wind mills. Field visit to biogas plants and wind mills. Bio-diesel preparation.

B.Sc. AGRICULTURE (HONS.) Semester – VI

Flori. 301: Flower Cultivation and Landscape Gardening

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.**

Flori. 301 Flower Cultivation and Landscape Gardening

Introduction to floriculture and landscaping. Package of practices for rose, jasmine, chrysanthemum, gladiolus, marigold and tuberose. Planning of gardens. Landscape-art principles, Formal and informal gardens. Use of trees, shrubs, climbers, houseplants and seasonal flowers in the gardens. Making and maintenance of lawns.

Practical: Identification of trees, shrubs, climbers, houseplants, seasonal flowers. Layout of lawns and maintenance. Potting, repotting and maintenance of houseplants. Training and pruning of rose. Pinching and disbudding chrysanthemum. Planning of gardens and development of garden features. Post-harvest handling of cut flowers.

B.Sc. AGRICULTURE (HONS.) Semester – VI

Pl. Path. 303 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.

Pl. Path. 303 Diseases of Horticultural Crops and their Management

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, coriander, coconut, betelvine, mulberry, coffee, 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. AGRICULTURE (HONS.) Semester – VI

PBG 304 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.**

PBG 304 Breeding of Field and Horticultural Crops:

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. AGRICULTURE (HONS.) Semester – VI

PFE-304 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.

PFE-304 Protected Cultivation and Post Harvest Technology:

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. Winnowing . Groundnut decorticators. Maize and castor shellers. Drying- grain drying, types of drying types of dryers. Storage grain storage, types of storage structures. Cleaning and grading equipments for fruits and vegetable. Size reduction equipments. Evaporators- principle and types. Quality standards.

Crop selection and constraints of greenhouse cultivation. Growing media, drainage, flooding and leaching, soil pasteurization, nutrient film technique (NFT)/ hydroponics.

Practical: study of different types of green houses. Calculation of air rate exchange system. Estimation of drying rate of agricultural products. Testing of soil and water suitability and fertigtion requirements for greenhouse. Study of threshers, Winnowers, groundnut decorticater and maize and castor shellers-their components, operation and adjustments. Improved grain storage structures, Study of dryers, cleaners and graders, Visit to commercial green houses. Growing media-their preparation and pasteurization/sterilization.

B.Sc. AGRICULTURE (HONS.) Semester – VI

Hort. 301 Post-Harvest Management of Fruits and Vegetables

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.

Hort. 301 Post-harvest Management of Fruits and Vegetables:

Importance. Maturity indices, harvesting and post harvest handling of fruits and vegetables. Maturity and ripening process. Factors affecting ripening and deterioration of fruits and vegetables. Chemicals used for delaying and hastening ripening. Methods of storage and low cost storage structures. Methods of packing, packaging materials and transport. Types of containers, cushioning material, vacuum packing, shrink packing, specific packing for export of mango, banana, grapes, Kinnow, sweet orange, and mandarin etc. Unit layout – selection of site and precautions for hygienic conditions.

Practical: 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. Types of packing and importance of ventilation. Pre cooling of horticultural crops. Methods of prolonging storage life. Effect of ethylene on ripening of fruits. Identification of equipments and machinery used in preservation of fruits and vegetables. Preservation by drying and dehydration. Visit to local market yards, cold storage units and packing house.

B.Sc Agric. F.M:

Farm Management and Production Economics

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess: 20
Periods per week: 04

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. Importance, Meaning and Scope of Farm Management, its relationship with other agricultural sciences
2. Nature, Meaning and Scope of Production Economics, Concept of production function.
3. Factor-Product relationship, Factor-Factor, Cost minimization and Product-Product relationship, optimum product combination.
4. Economics Principles used in Farm management i.e. Principles of diminishing return, costs, factor substitution, product substitution, equimarginal returns and time comparison. Theory and application.
5. Categories of cost, relationship of different costs and cost functions.
6. Management of different factors of production i.e. land, labour, capital, farm power and machinery. Natural resource management especially land and water.
7. Systems of farming and types of farming. Factors affecting types of farming. Specialisation and diversification in agriculture.
8. Farm Planning and Budgeting, methods of valuating farm resources, steps in farm planning and organization of farm business. Concept of linear programming.
9. Nature and objectives of accounts and farm income. Computer application in maintenance of accounts.
10. Study of Economic problems in Indian Agricultural production, marketing, credit etc. Place of Agriculture in five year plans.

Suggested Readings:-

1. Fundamentals of Farm Business Management- S.S. Johl and T.R. Kapoor.
2. Agricultural Production Function- Earl O' Heady & Dillon.
3. Agricultural Economics – R.K. Lekhi & Joginder Singh.
4. Farm Business Management – Peter H. Calkins & Densi D. Di Pietre.
5. Production Conditions in Indian Agriculture- K. Bhardwaj.

B.Sc Agric. F.M:

Farm Management and Production Economics
(Practical)

Time: 3 Hours **Max. Marks: 50**
Practical: 40
Int. Assess.: 10
Periods per week (Pract): 03

Visit to selected farms, study their layout, organization and operation. Exercise on alternate choice in farm management, preparation of layout maps. Application of basic principles of farm management, enterprise budgets, labour and farm budgets and power budgets and farm record analysis. Computerisation of land records and preparation of balance sheets.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc. Agric. Ento.: **Economic Entomology**

Time 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess.: 20
Periods per week (Theory): 4

Instructions for the Paper Setters:
1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight and simple.
3. Not more than one question should be based on one topic.
4. The question paper should be 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 pest. Losses from pests of Agricultural crops and their products, Natural control and factors causing outbreak of pests of Agricultural importance. Principles and methods of pest control-physical, mechanical, cultural, biological, chemical, integrated, legal supervised control, pest management, economic injury and Economic threshold. Common pesticides, their formulation and methods of application, safe handling and antidotes.

Biology, nature and extent of damage and control of the insect pests of sugarcane, cotton, cereals, Pulses, oil seeds, vegetables. Fodder, fruit trees, stored grains, Household and general insect Pests like Termites, Hairy Caterpillar, Locusts.

Study of non-insect pests like nematodes, mites, birds flying foxes, rodents, monkeys, Jackals etc. A general account of useful birds and mammals and their encouragement.

Detailed account of Apiculture, sericulture and lac-culture. Insect pests and diseases of honey bees, silkworm, lac insects and their control Predators, Parasites pollinators.

Storage of farm products, common pests and their control. Study of pest control equipments, its classification. Principles of working, care & maintenance. Pest control organisation at State and National levels with a general account of the cordiantion at the International level.

Properties of pesticides, mode of entry and action, factors affecting toxicity, compatibility, synergism, repellents attractants, hormones, chemosterilants, pheromones antifeedants.

B.Sc. Agric. Ento.: **Economic Entomology (Practical)**

Time 3 Hours **Max. Marks : 50**
Practical : 40
Int. Assess. : 10
Periods per week (Practical) : 3

Collection and preservation of insects. Rearing techniques and rearing of stored grain pests. Identification of various pests of field crops, vegetables, fruit trees and house hold products. Identification of pest damage in respect of field crops, vegetable in fruit trees. Preparation and application of various pesticides.

Study of different types of application equipment, including Sprayers, Dusters, seed disease their structure, working, handling care and maintenance practices in field operation of the pests control.

Identification of different species of honeybee and their castes. Handling and management of honeybee colonies for productive bee keeping. Extraction and processing of cocoons and their processing.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc. Agric. Ext.: **Agricultural Extension**

Time 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess.: 20
Periods per week (Theory): 4

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight and simple.
3. Not more than one question should be based on one topic.
4. The question paper should be 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

A. **Introduction to Extension Education:-** Meaning, Nature, Philosophy, Importance, scope History. Principles and objectives of extension education. Similarities and dissimilarities between extension education and community development.

B. **Extension Teaching–Learning:-** Elements in extension teaching process, extension–Learning. Extension teaching process, factors affecting extension—teaching—learning. Extension teaching methods–their classification, effectiveness, choice and use. Audio visual aids—their classification and use.

C. **Programme Planning and Evaluation:-** Programme planning—meaning, principles, steps in programme planning. Extension evaluation—Meaning, Importance, steps in extension evaluation, types of extension evaluation.

D. **Communication in Extension Education :-** Meaning, Nature modes and importance of communication, problems in communication and feed back, key-elements and their effectiveness in communication process.

E. **Extension Administration for Rural Development:-** Nature and principles of extension administration and supervision, role and qualities of a good extension worker, supervisors, and administrator. Concept of extension organisation. Rural development Post strategies and current approaches, organisational and operational programmes in India.

F. **Adoption and Diffusion of Innovations:-** Adoption period, adoption process, stages in adoption process, categories of adopters characteristics of Agricultural innovations, Diffusion of innovation in a social system.

G. **Rural Sociology and Caste System:-** Rural sociology – Its meaning definition, scope and origin, relationship with other sciences, Rural—urban differences, caste system in India. Economic and political life of rural people, Rural social system beliefs, values and taboos.

B.Sc. Agric. Ext.: **Agricultural Extension (Practical)**

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

Practical: 40

Int. Assess.: 10

Periods per week (Practical): 3

Preparation and use of Audio—Visual Aids. To develop and evaluate extension programme, Acquiring skill in the preparation & use of various audio visual aids and equipments. Use of selected teaching methods—individuals, Group and Mass contact in field situation.

Visit to Agricultural extension and rural development agencies to study their organisational set up and programmes.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc Agric. Stats: Agricultural Statistics

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess: 20
Periods per week (Th): 04

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.
6. Scientific Calculator shall be allowed.

Theory

Sampling and Sample Designs: Sample v/s census, Theoretical basis of sampling, Methods of sampling: Simple random sampling (with and without replacement), stratified random sampling, systematic sampling, multistage sampling, cluster sampling, quota sampling. Planning and execution of surveys, sampling and non- sampling errors.

Analysis of time series data, estimation of linear trend, periodic and random variations, fitting of exponential curve $Y = ab^x$.

Index numbers, Laspeyre's Paasche's and Fisher formula, requirement of an ideal index and its uses.

Statistical Inference: Procedure of testing hypothesis, Type I and Type II errors, two tailed an one tailed test of hypothesis, Sampling distribution and standard error. Tests of significance for single mean and difference of means in large and small samples.

Principle of Experimental Design: Uniformity trials- size and shape of plot, role of Randomisation, local control and replication.

Layout and analysis of completely randomised design, Randomised block design, Latin square design including one missing value.

Suggested Readings:

1) Fundamentals of Statistics – S.C. Gupta.
2) Statistical Methods – S.P. Gupta.
3) A Handbook of Agricultural Statistics – Dr. S.R.S. Chandel.
4) Statistical Methods for Research Workers – Sukhminder Singh & Others.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc Agric. Stats: **Statistics**

(Practical)

Time: 3 Hours **Max. Marks: 50**
Practical: 40
Int. Assess.: 10
Periods per week (Pract): 03

1. Experiment on simple random sampling with and without replacement.
2. Experiment of stratified random sampling.
3. Experiment on ratio method of sampling.
4. Fitting of linear trend to time –series data.
5. Fitting of exponential trend to time –series data.
6. Calculation of index numbers.
7. Test of significance for single mean in small and large samples.
8. Test of significance for difference of means in small and large samples.
9. Analysis of variance one way and two way.
10. Analysis of completely randomised design.
11. Analysis of randomized block design.
12. Analysis of Latin square design.
13. Analysis of RBD with one missing value.
14. Analysis of LSD with one missing value.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc. Agric. Oleri.: Olericulture, Floriculture & Land Scaping

Time 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess. : 20
Periods per week (Theory): 4

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

Theory

Olericulture: Scope and importance of vegetable growing in Punjab and role in human diet. Climate and soil factors effecting the growth of vegetable seeds; vegetable forcing; Kitchen gardening methods, Callender of operations, programme for the continuous supply of vegetable throughout the year. Problems of commercial vegetable growing in Punjab, Cultivation practices for important winter and summer vegetables crops of Punjab.

Floriculture: Importance and scope of floriculture in Punjab ; seed production and multiplication of ornamental plants; general cultivation of important winter, summer, and rainy seasons annuals Bulbous plants viz Canna, Amarylis, Dahlia, Gladiolus Gerbera Crysanthemum, their culture, procurement and storage of bulbs. Cultivation of important ornamental trees, shrubs, hedges and climbers. Cultivation of succulent plants as Bryophllem, Sanseveria, Euphorbia and cacti. Cultivation of Roses, Cultivation of indoor plants.

Land Scaping :- Principles and concept of Landscape gardening. Famous gardens of India and their special features of layout. Preparation of landscape plans for schools; Colleges, Public places, Highways and Domesticated places and study of Plants used, terrace gardening, Establishment and maintenance of lawns.

Suggested Readings:

1. Vegetable Growing in India – DVS Chauhan
2. Introductory Ornamental Horticulture – JS Arora
3. Package of Practices for Vegetable Crops – PAU Ludhiana
4. Package of Practices for Flowers Crops – PAU Ludhiana
5. Vegetable Gardening – WCS Cooper
6. Vegetable Growing – James S Shoemaker and Thomas Baker
7. Commercial Floriculture – S Prasad and U Kumar

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc. Agric. Oleri.: Olericulture, Floriculture & Landscapping.

(Practical)

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

Practical: 40

Int. Assess.: 10

Periods per week (Pract.): 03

1. Propagation of ornamental plants through seeds cuttage, layerage and graftage.
2. Identification of the plant materials given in the syllabus.
3. Preparation of layout plans and landscaping of park, bungalows and school premises etc.
4. Practice in preparation of different types of flower beds, making the maintenance of lawns.
5. Planting, training and trimming of shrubs, hedges and climbers.
6. Identification of different kinds and varieties of vegetables given in the syllabus.
7. Practices in vegetable growing, laying out a kitchen garden and growing vegetables in window boxes and pots.

Additions in Practical-

1. Sowing and transplanting of vegetable crops
2. Vegetable nursery production and vegetable forcing techniques.
3. Nutrient deficiency symptoms in vegetables.
4. Diseases and Disorders of vegetable crops.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

Agron Elective–I

B.Sc Agric.: **Seed Production Technology**

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess.: 20
Periods per week (Th): 04

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 its characteristics, Agronomic practices for raising quality seed of cereals, pulses, oil seeds, tuber, sugar and fodder crops and production of hybrid maize seed in multiplication of breeder's seed.

Physiology of seed development, dormancy, viability, maturity, germination and seedling vigor. Environmental factors affecting seed quality. Seed certification- Standards and inspection. Seed processing – Cleaning, treatment, packing, storage and marketing. Seed industry and seed act.

Weeds- Harmful and useful aspects, characteristics, reproduction, dissemination, dormancy, establishment and persistence. Crop weed competition, common summer, winter, perennial and aquatic weeds. Methods of weed control–preventive, mechanical, chemical, biological and integrated. Herbicides usage in different crops orchards, forests, public lands and water courses. Weeds and crop association. Classification of herbicides, properties and functions. Application of selective and non- selective herbicides. Hazards of chemical weeding.

Suggested Readings:

1. Weed Control- O.P. Gupta.
2. Seed Technology- Rattan Lal Aggarwal.
3. Principles of Agronomy- S.R. Reddy
4. Principles of Agronomy- Reddy & Reddy

B.Sc Agric.: **Agronomy Elective- I**

(Practical)

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

Practical: 40

Int. Assess.: 10

Periods per week (Pract): 06

Seeds identification, seed analysis for purity and germination. Breaking of dormancy, tests for viability. Sowing and maintenance of seed production field of important crops. Visits to commercial seed production fields, seed processing plants and seed sale agencies. Planning for establishment of seed production farms.

Identification of terrestrial an aquatics weeds and their seeds. Weed survey.

Reproductive potential of annual and perennial weeds. Weed control in field crops. Methods of herbicide application and computation of dosage. Calibration of spray pumps. Identification of crop symptoms due to faulty weedicide. Application.Precaution for safe use of weedicides and useful antidotes. Visit to weed control experiments and aquatic weed sites. Project planning for consultancy/ custom services for chemical weed control in crops.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

Agron Elective–II

B.Sc Agric.: Ecology and Crop Physiology

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess.: 20
Periods per week (Th): 04

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

Ecology and its relevance to man. Concept of ecosystem and energy flow. Food chains and energy output relationships. Agro- ecosystem and Agro- ecological zones of India. Efficient food producing systems.

Farming systems arable, pastoral, lay farming, shifting cultivation, ranching and agro-forestry systems, energy and fuel wood plantation. Specialised and diversified farming.. Factors affecting choice of farming systems. Cropping systems, their characteristics and management. Cropping patterns. Farm selection, size of the farm and farm layout, cropping schemes and crop plan. Resource management in relation to farm cropping system. Crop yield appraisals.

Physiological processes in crop growth and development. Photosynthesis and respiration in relation to crop canopy. Phasic development- phtotperiodism, thermoperiodism and vernalisation in crop production. Manipulation of conditions for optimizing germination, growth and economics components. Root development under variable environments. Use of growth regulators for modifying growth, flowering, abscission, desiccation and fruiting. Physiological maturity and criteria for crop harvest and storage. Biological nitrogen fixation.

Suggested Readings:

1. Principles of Agricultural Ecology - G.S. Dhaliwal & D.S. Kaler.
2. Principles & Practices of Agronomy- P. Balasubramaniyam & S.P. Palaniappar.
3. Manures & Fertilizer- K.S. Yawalkas, J.P. Aggarwal, S. Bokde.
4. Nature & Properties of Soil- N.C. Braddy.

B.Sc Agric.: **Agronomy Elective- II**

(Practical)

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

Practical: 40

Int. Assess.: 10

Periods per week (Pract): 06

Analysis of Crop ecosystem components. Light measurement in pure and mixed crop stand. Modifications in crop environment. Measuring temperature, light and moisture effects. Preparation of farm layout plans. Different intensity crop rotations and cropping schemes. Estimating crop yields. Working out ecological optimum crop zones. Energy budgeting in different crops and cropping systems. Project making for establishment of crop production farms under different situations.

Braking of seed dormancy. Seedling emergence in relation to sowing depth and moisture regimes. Growth rate and fruiting patterns under different situations. Nutrient deficiency symptoms. Growth regulators for manipulation of crop growth. Nodulation studies in legumes. Judging of physiological maturity of field crops.

Testing seed germination under salt affected, acidic and dryland conditions. Mulching for moisture conservation and temperature regulation. Use of anti transpirants, water harvesting techniques, fertilizer application, use of implements in soil conservation. Estimation of soil loss by wind and water erosion. Visit to the problem area. Making fodder production plan.

B.Sc Agric. **Elective-III (Agron)**

Crop Production under Special Situations: Soil Fertility and Fertilizers Use

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess.: 20
Periods per week (Th): 04

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.

Plant nutrients-criteria of essentiality, 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.

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.

Suggested Readings:

1. Principles of Crop Production - S.R. Reddy.
2. Principles of Agronomy- Reddy & Reddy.
3. Principles of Agronomy- S.R. Reddy.
4. Principles of Agricultural Geology- G.S. Dhaliwal & D.S. Kaler.
5. Name & Properties of Soil- N.C. Braddy.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

Soil Elective–I

B.Sc Agric.

Systematic Study of Soils in Relation to Geology, Genesis, Classification, Hydrology & Erosion

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

Theory: 80

Int. Assess: 20

Periods per week (Th): 04

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

Structure of earth. Minerals & rocks- classification, origin, properties and distribution. Mineral and rock weathering in relation to soil formation. Weathering sequence of minerals. Geochemical behaviour of elements. Fluvial, glacial, marine, lacustrine and Aeolian landforms. Soil landscape relationship and its application in soil mapping. Geological time scale. Geology and soils of three major physiographic units of India. Soil genesis concepts. Pedogenic processes and their relationship with plant growth. Pedon, poly-pedon, profile, horizons and their nomenclature. Factors of soil formation and their dynamics. FAO/ UNESCO World soil reference system. Soil Taxonomy- epipedoms, diagnostic surface and sub- surface horizons and other diagnostic features, soil moisture and temperature regimes, categories of the system and their criteria. Soils of India and their placement in Soil Taxonomy. Soil survey and mapping. Land capability and land irrigability classification.

Soil- a water reservoir. Volume- mass relations. Computation of depletion and accretion of profile water. Forces of water retention. Soil water potential- components and distribution above and below water table. Soil moisture characteristics. Saturated and unsaturated water movement, infiltration and redistribution. Components of field water balance and their computation. Evaporation in the presence and absence of water table. Criteria for scheduling irrigation. Recent concepts of water availability. Drip and sprinkler irrigation. Soil erosion- significance, causes, types and process. Water erosion- rainfall characteristics, effect of rain drop, overland flow, topography, vegetation and soil properties. Runoff- factors affecting and its measurement. Universal soil loss equation- interpretation and evaluation of contributing factors. Wind erosion – factors affecting, estimation of soil loss and control measures.

Suggested Readings:

1. Boul SW, Hole ED, MacCraken RJ 1995. Soil Genesis and Classification. 3rd Ed. Iowa State Uinv. Press.
2. Sehgal J. 2002. Pedology- Concepts and Applications. Kalyan Publ.
3. Brady NC & Weil RR. 2002. Nature and Properties of Soils. 13th Ed. Pearson Edu.
4. Likens GE & Bormann FH. 1995. Geochemistry. 2nd Ed. Springer Verlag.
5. Muthyayya VD 1988- A Text Book of Geology. Oxford & IBH.
6. Hillel D. 1971. Soil & Water: Physical Principles & Processes. Academic Press.
7. Baver LD, Gardner, WH & Gardner WR. 1972, Soil Physics, John Wiley & Sons.
8. Ghildyal BP and Tripathi R.P 1987. Soil Physics. Wiley Eastern Limited.

B.Sc Agric. **Soil Elective- I**
(Practical)

Time: 3 Hours **Max. Marks: 50**
Practical: 40
Int. Assess.: 10
Periods per week (Pract.): 06

Use of petrological microscope. Identification of rocks and minerals. Crystal systems. Study of landform with models. Interpretation of geological maps.

Characterization and classification of soil profiles developed on different landforms. Use of aerial photographs and remote sensing in soil resource mapping. Detailed soil survey, preparation of interpretive maps based on soil survey and land use capability classification to know suitability of soils for growing different crops and writing of report of a project area. Determination of soil particle density, bulk density, moisture, infiltration and drainage characteristics in field, advancement of wetting front in homogeneous and layered soil columns, unsaturated hydraulic conductivity and evaporation measurements. In situ measurement of soil water by neutron probe and soil matric potential by tensiometer. Measurement of rainfall. Frequency and probability analysis of long term rainfall data. Measurement of runoff and soil loss. Determination of clay, dispersion, erosion ratios, and erosion index of soil. Estimation of soil loss by wind erosion. Determination of mechanical and chemical composition of wind blown and water eroded sediments. Field excursions.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc Agric. **Elective- II (Soil)**

Fundamentals of Soil Chemistry, Fertility, Biology and Biochemistry including Water and Fertilizer Testing

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Asst.: 20
Periods per week (Th): 04

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 Colloids- nature, properties, origin of charge and their significance. Cation and anion exchange phenomena and their importance. Introduction to ionic adsorption, desorption and fixation. Soil Reaction. Acid, saline, saline sodic, sodic and calcareous soils- distribution, characterization, genesis and amelioration. Plant reaction to soil salinity, sodicity and acidity. Plant nutrients- criteria of essentiality, functions, deficiency symptoms, contents and distribution in soils. Nutrient transformations, retention and availability. Nutrient interactions. Methods of soil fertility evaluation. Fertilizers and their fate in soils. Crop responses to fertilizers. Fertilizer use efficiency. Concept of integrated fertilizer use and water management in soils. Current fertilizer consumption, future trends and needs. Nutrient removal by crops. Maintenance of soil fertility.

Soil biology and biochemistry- importance and historical developments. Micro and Macro organisms in soils- classification, distribution and activities. Mycorrhiza. Nutritional and biochemical aspects of growth of microbes. Antibiotics production in soil. Role of microbes in biochemical decomposition of organic manures and farm wastes, composting and vermicomposting. Biochemistry of humus formation and biogas production. Pesticide metabolism. Soil testing – importance and problems. Principles in the determination of soil pH, EC, available nitrogen, phosphorus, potassium, sulphur in soils. Fertilizer analysis. Quality of irrigation water.

Suggested Readings:

1. Bear FE. 1964. Chemistry of Soils. Oxford & IBH.
2. Mengel K & Kirby EA. 2006. Principles of Plant Nutrition. 5th Ed. Springer (India) Pvt. Ltd.
3. Van Elsas. 2007. Modern Soil Microbiology. CRC Press. SOILS 509
4. Halvin JL., Tisdale SL, Beaton JD & Nelson WL 2006. Soil Fertility and Fertilizers: An Introduction to Nutrient Management, 7th Ed., Prentice Hall.

5. Brady NC & Weil RR. 2002. Nature and Properties of Soils. 13th Ed. Pearson Edu.
6. Kannaiyan S, Kumar K & Govindarajan K. 2004. Biofertilizers Technology. Scientific Publ.
7. Jackson ML. 1973. Soil Chemical Analysis. Prentice Hall.

B.Sc Agric. **Soil Elective- II**
(Practical)

Time: 3 Hours **Max. Marks: 50**
Practical: 40
Int. Assess.: 10
Periods per week (Pract): 06

Determination of the effect of dilution and salinity on soil pH. Active and potential acidity. Cation and anion exchange capacity and exchangeable cations. Soluble salts in soils. Lime and gypsum requirements. Nutrient adsorption and fixation capacities of soils. Customers service for reclaiming saline sodic soils. Analysis of soils for different forms of nitrogen, phosphorus, potassium and sulphur. Determination of DTPA extractable micronutrients. Plant analysis for total nitrogen, phosphorus and potassium. Collection of soil, irrigation water and fertilizer samples. Preparation of standard solutions. Colorimetric and flame photometric methods. Analysis of soil for fertilizer recommendations and suitability for orchard plantation. Analysis of irrigation water. Analysis of fertilizer for quality control. Planning and formulation of project on establishment of soil, water and plant testing laboratories. Use of microbiological laboratory wares. Media preparation. Quantitative estimation of bacteria, fungi, actinomycetes, blue green algae, Nitrosomonas, Nitrobacter, Azotobacter and Rhizobium. Activities of dentrifier. Measurement of decomposition of soil organic matter. Preparation of enriched compost, biofertilizers and vermiculture.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc. Agric. **Elective-III (Soil)**

General Physical Chemistry

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

Theory: 80

Int. Assess.: 20

Periods per week (Th.): 4

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight and 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

Kinetic theory of gasses, Maxwell law of distribution of Velocities, Colloids, preparation and properties. Zeta potential and its measurements, Origion of charge on colloidal particle. Emulsion and gels, Adsorption and different adsorption isotherms. Application of Colloids and Absorption, Macromolecules, varieties of macromolecules, Molecular weight of polymers, Number average and weight average molecular weight. Methods of molecular weight determination of macromolecules, Chemical Equlibrium, Ionic Equilibria Acids and Bases pH value, Buffer sulution and Hendeson's equation, Salt Hydrolysis, Solubility product and its applications. Theory of Indicators, Photochemistry, Radio-activity, Isotopes and Isobars.

B.Sc. Agric. **Elective-I (Horticulture)**

Fundamentals of Fruit Production

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess.: 20
Periods per week (Th.): 4

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight and 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. Winter injuries, Seed and bud dormancy. Protection of fruit against adverse climatic conditions. Water requirement of fruit crops and factors influencing it. Critical period of water supply, wilting point, wilting co-efficient and wilting of fruit plants under field conditions. Available moisture and drought resistant. Adoption of roots to moisture conditions. Factors influencing rate of transpiration and moisture absorption. The response of fruits plants to varying conditions of soil moisture and humidity. Influence on new shoot formation, vegetative growth, yield and fruit development and cropping time and method of irrigation. Orchard soil management methods. Their relation to moisture conservation and nutrient supply. Different types of soils. Nutrients and their availability. Soil improvement and maintenance of organic matter in the soil. Macro and micro elements. Detection of nutrient deficiency in the orchards. Method and time of application, Role of different elements in Horticulture.

Training and pruning of fruits. Method of training Difference between training and pruning. Principles of pruning. Pruning as a necessary evil. Bearing habits of fruit plants.

Response of amount and severity of pruning. Pruning methods and their impact on size colour quality and yield of fruits. Season of pruning.

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. Indices for determing maturity standards of fruits. Post harvest handling of fruits. Physical and bio-chemical aspects; Harvesting and field handling. Packing, Transportation, marketing and storage aspects. Physiological and pathological disorders during storage.

Pollen viability and germination; stigma receptivity and pollination studies in fruits.

Suggested Readings:

1. Basic Horticulture – Jatinder Singh
2. Fruit Growing – Dr.JS Bal
3. Package of Practices for Fruit Crops – PAU Ludhiana
4. A Text Book of Pomology Vol-I – TK Chattopadhya
5. Fundamentals of Fruit Production – VR Gardener, FC Bradford and HD Hooker
6. Fruit Physiology and Production – Amar Singh
7. Horticulture Science – Jules and Janick
8. The Pruning of Fruit Trees and Vines – JC Bakshi, DK Uppal and HN Khajuria

B.Sc. Agric. **Elective-I Horticulture**
(Practical)

Time: 3 Hours **Max. Marks: 50**
Practical: 40
Int. Assess.: 10
Periods per week (Th.): 6

Identification and description of fruit varieties. Layout, planting, irrigation systems and cultural practices in the orchard. Protection of fruit plants against heat and cold. Collection of leaf and soil samples, fertilization needs and nutrition deficiency symptoms. Bearing habits and types of inflorescence in fruit plants. Training, pruning, ringing and thinning methods. Judging of maturity standard in fruits. Picking, packing, grading and storage of fruits and yield estimation of orchards.

B.Sc. Agric. **Elective-II (Horticulture)**

Systematic Pomology, Propagation and Nursery Management

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess.: 20
Periods per week (Th.): 4

Note : Examiner should set at least 3 or 4 questions from Part A and five questions from Part B. Students will have to attempt 2 questions from Part A and 3 from Part B.

Theory

PART-A

SYSTEMATIC POMOLOGY

Introduction significance, History, Principles of Systematic pomology Plant Nomenclature, Identification.

Description and classification of fruits of order Rosales, Rhamnales, Sapindales, Myrtales, Geraniales, Palmales with special reference to fruits grown under Punjab conditions.

PART – B

PLANT PROPAGATION AND NURSERY MANAGEMENT

Introduction

Media, its propagation structures, mist propagation.

Apomisis, its types and significance in fruit crops.

Seed dormancy, its types, regulation of germination, environmental and dormancy factors affecting seed germination, preconditioning of seeds to stimulate germination.

Importance of asexual propagation, clone, genetic variation in asexually propagated plants.

Cuttage : Anatomical development of roots and shoots, Physiological, basis of root initiation effect of leaves and buds, polarity, factors affecting regeneration. Type of cuttings, treatment of cutting and techniques of propagation by cuttings.

Layering : Factors affecting layering procedure, characteristics and uses of layering.

Graftage: Techniques types of Budding and Grafting, terminology classification of grafting according to placement, Herbaceous, Nurse root and Nurse seed grafting. Top Working, Double working, micro budding, crown grafting.

Reasons for grafting and budding, formation of graft union, healing process in budding, Factors influencing the healing of graft union, graft hybrids, polarity, limits of grafting, selection storage of bud wood scion.

Graft incompatibility, Stionic influences.

Propagation by specialized stems and Roots with special reference to fruit corps.

Aseptic Methods of micro-propagation. General techniques for preparing cultures for micro propagation procedures for culturing various tissues and organs.

Propagation Methods and Root stocks for important fruit crops Apple; Citrus, mango, Pear, Peach, Plum, Guava etc.

Physiological basis of dwarfing.

Suggested Readings:

1. Plant Propagation Principles and Practices – HT Hartman, DE Kester, Fred T Davies Jr. and RL Geneve
2. Plant Propagation – RR Sharma
3. Vegetative Propagation of Plants – KK Nanda and VK Kochhar
4. Propagation of Horticultural Plants – GW Adriance and FR Brison
5. Plant Taxonomy – OP Sharma
6. Modern Systematic Pomology – QB Zielinski
7. Practical Manuals of Various Universities on Systematic Pomology

B.Sc. Agric. **Elective-II Horticulture**
(Practical)

Time: 3 Hours **Max. Marks: 50**
Practical: 40
Int. Assess.: 10
Periods per week (Practical): 6

Identification and description of important fruit species and identification of nucellar seedlings in citrus.

Fruit types, their description, edible portions and time of ripening.

Pollen viability and germination, stigma receptivity and polination studies in fruits. Extraction drying and storage of seeds and testing seed viability.

Stratification and other seed treatments. Preparation of seed beds, seed sowing, practices in plant propagation techniques like cutting, layering, budding and grafting methods. Application of growth regulators in propagation methods.

Packing-transplanting, and after care of nursery plants and other nursery managements, Insect, pests, disease and weed control in nurseries and orchards.

Preparation of wound infectant solutions like grafting wax, bourdaux, paste, paint and white wash mixtures.

Visits to various fruit research stations and nurseries.

Pollen viability and germination; stigma receptivity and pollination studies in fruits.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc. Agric. **Elective III (Horticulture)**

Fruit Growing

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess.: 20
Periods per week (Th.): 4

Instructions for the Paper Setters:

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight and 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

Fruit Growing:-

A. Importance, scope and development of Horticulture in India with special reference to Punjab. Challenges to be faced by the fruit Industry.
B. Detailed studies of following fruit crops regarding their importance, origin, distribution, cultivation and progress of work in India with special reference to Punjab.

1. **Tropical Fruits:** Mango, Citrus, Grapes, Papaya, Guava, Litchi, Loquat, Ber, Phalsa, Pomegranate and Amla.
2. **Temperate Fruits:** Pear, Peach, Plum and Almond, apple, cherry, olive, persimmon.
3. **Plantation Crop:** Coconut, Cashewnut.
   Cultivation of Tea and Rubber

Suggested Readings:

1. Fruit Growing – Dr.JS Bal
2. Package of Practices for Fruit Crops – PAU Ludhiana
3. A Text Book of Pomology Vol. II-IV – TK Chattopadhya
4. Temperate Fruits – TK Bose (ed.)
5. Fruits Tropical and Sub-Tropical Vol.-1 – TK Bose (ed.)
6. Handbook of Horticulture – KL Chadha (ed.)
7. Tropical Horticulture Vol-1 – TK Bose (ed.)

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc Agric. **Elective- I (Ag. Econ.)**

Economic Problems of Indian Agriculture & Rural Sociology

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess: 20
Periods per week (Th): 04

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) Importance of Agriculture in Indian Economy, comparison with other countries.
2) Trends in Agricultural Production and productivity. Deceleration of Agricultural growth rates in India, causes and effective measures to check it.
3) Land reforms: Objectives, abolition of intermediaries, Tenancy Reforms, Ceilings on Agricultural holdings, Consolidation, Cooperative farming, Evaluation, Recent land legislation and Enforcement.
4) Rural Indebtness: Causes, Effects, Government measures to control it. Recommendations of Dr. Radha Krsihnan's and RBI's report on Rural Indebtness.
5) Rural Poverty: Measurement and Poverty alleviation programmes.
6) Agricultural Labour in India: Problems and remedies.
7) Agricultural Exports: Problems and prospects, past experiences and future strategies for export growth.
8) Agricultural Taxation: Case for Agricultural Taxation. Case for special treatment.

Suggested Readings:-

1. Leading Issues in Agricultural Economics – R.N. Soni.
2. Agricultural Economics – R.K. Lekhi and Joginder Singh.
3. Agricultural Problems of India- Dr. C.B. Memoria and B.B Tripathi.
4. Agricultural Problems of India -Bansil, P.C.
5. Land Reforms in India- Trends and Perspectives, P.C. Josh, Allied Publishers, Mumbai.
6. Indian Economy- S.K. Mishra & V.K. Puri.

B.Sc Agric. **Ag. Econ. Elective- I**

(Practical)

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

Practical: 40

Int. Assess.: 10

Periods per week (Pract.): 06

Assign a visit to a village to team of five students to obtain.

1. a) Distribution of cultivated land to various size groups of farm.
   b) Degree of change of ownership and tenancy.
   c) Cropping pattern and Agricultural inputs.
2) Study of the family budget of two farmers. Tabulation of information to show the major items of expenses, food and clothing habits, housing and other facilities. Preparation of 100 word report.
3) Preparation of questionnaires and schedule for an economic survey.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc Agric. **Elective- II (Ag. Econ.)**

Agricultural Marketing & Co-operation

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess: 20
Periods per week (Th): 04

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

What is co-operation, principles of cooperation. Co- operation in the National planning.
Organisation, financial structure and general working of following co-operative societies.

1. Primary Agricultural Credit Societies.
2. Multi- Purpose Societies.
3. Large size primary credit societies.
4. Labour co- operative society.
5. Agricultural Service Co-operative society.

Success, failure of Co-operative sector in India. Role of Co- operatives under emerging economic policy.

Co-operative farming, meaning, objectives, types, merits and demerits.
Study of Co- operative movement in Canada, Germany, Japan and England.
Agricultural Marketing: Definition, importance, types and defects. Methods of study, functional, institutional and commodity approach.

Marketing functions and services: Assembling, Processing, Distribution, Packing, Standardization, Grading and Transportation.

Role of State Marketing Board, Public – Private partnership in Marketing, Contractual farming, Entry of Corporates in Agricultural Marketing.

Suggested Readings:-

1. Agricultural Economics – R.K. Lekhi and Joginder Singh.
2. Agricultural Marketing in India- Dr. S.S. Acharya and N.L Aggarwal.
3. Indian Foodgrain Marketing -Moore, J.R, Johl S.S, Khusro A.M.
4. Foodgrain Marketing Systems in Inidia, Structure and conduct- Kainth G.S.
5. Theory, history and practice of Co- operation – R.D. Bedi.

6. Agriculture Co- operation in India- C.B. Memoria.

B.Sc Agric. **Ag. Econ. Elective- II**
(Practical)

Time: 3 Hours **Max. Marks: 50**
Practical: 40
Int. Assess.: 10
Periods per week (Pract): 06

1. Visit to wholesale and retail shops (Mandis) to study Marketing methods and practices with respect to major Agricultural commodities, preparation of a report.
2. Visit to market committee to know the facilities provided to the farmer, various market charges paid by farmers and buyers.
3. Visit to Co-operative societies to get first hand knowledge of their methods of working, preparation of a report.

B.Sc. AGRICULTURE (HONS.) PART – IV (ANNUAL SYSTEM)

B.Sc Agric. **Elective-III (Ag. Econ.)**

Micro & Macro Economics

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Int. Assess: 20
Periods per week (Th): 04

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

Nature and scope of Economics, Micro & Macro Analysis. Theory of consumer behaviour: Marginal Utility Analysis, Indifference Curve Analysis. Elasticity of demand and supply. Cost Curves, Revenue Curves. Forms of Market Structure and Price determination under perfect competition, monopoly and monopolistic competition.

Macro Economics

National Income Accounting: Keynesian and Post Keynesian concepts. Simple Keynesian model of Income determination. Theories of consumption, Investment and Interest rate. Multiplier, Wages and employment policies. Inflation: Causes, Remedies and theories.

Suggested Readings:

1. Macro Economic Theory by M.C.Vaish.
2. Advanced Economic Theory by H.L. Ahuja.
3. Modern Micro Economics- by A. Koutsoyiannis.