FACULTY OF AGRICULTURE & FORESTRY

SYLLABUS

For

B.Sc. AGRICULTURE (HONS.)
(Semester I – VIII)
Session: 2016–17

GURU NANAK DEV UNIVERSITY AMRITSAR

B.Sc. AGRICULTURE (HONS.) (SEMESTER SYSTEM)

SEMESTER–I

Sr. no.	Course Code	Subject	Periods Per Week		Total Marks		Grand Total
			Th.	Prac.	Th.	Prac.	
1.	AGR–111	Introductory Agriculture	4	3	50	25	**75**
2.	AGM–112	Introductory Agro meteorology	4	3	50	25	**75**
3.	MBL–113	Elementary Microbiology	4	3	50	25	**75**
4.	SSC–114	Introduction to Soil Science	4	3	50	25	**75**
5.	AGE–115	Principles of Agricultural Economics	4	0	50	—	**50**
6.	BOT–116 MAT–116	Basic Botany/ Basic Maths–I	2 4	2 0	25 50	25 —	**50** **50**
7.	ENG–117	Communication Skills in English-I	–	–	50	—	**50**
8.	GPB–118/ BPB–118	Punjabi (Compulsory) / ਮੁੱਢਲੀ ਪੰਜਾਬੀ	4	0	50	—	**50**
		Total	**30**	**14**	**390**	**110**	**500**

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)

SEMESTER–II

Sr. no.	Course Code	Subject	Periods Per Week		Total Marks		Grand Total
			Th.	Prac.	Th.	Prac.	
1.	VSC–121	Vegetable Production Technology	4	3	50	25	**75**
2.	BCH–122	Elementary Biochemistry	4	3	50	25	**75**
3.	FOR–123	Introductary Forestry	4	3	50	25	**75**
4.	SSC–124	Soil Chemistry, Soil Fertility and Nutrient Management	4	3	50	25	**75**
5.	PBG–125	Principles of Genetics	4	3	50	25	**75**
6.	ZOO–126 /MAT 126	Basic Zoology/ Basic Maths–II	2 4	2 0	25 50	25 —	**50** **50**
7.	ENG–127	Communication Skills in English-II	--	--	35	15	**50**
8.	GPB–128 /BPB–128	Punjabi (Compulsory) / ਮੁੱਢਲੀ ਪੰਜਾਬੀ	4		50	—	**50**
9.	CSE–129	Introduction to Computer Application	3	3	25	25	**50**
		TOTAL:	**37**	**20**	**450**	**175**	**575**

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)

SEMESTER-III

Sr. no.	Course Code	Subject	Periods per Week		Total Marks		Grand Total
			Th.	Prac.	Th.	Prac.	
1.	AGR-211	Principles of Agronomy- I (Kharif Crops)	4	3	50	25	75
2.	BOT-212	Crop Physiology	4	3	50	25	75
3.	ENT-213	Insect Morphology and Systematics	4	3	50	25	75
4.	EXT-214	Dimension of Agriculture Extension	4	3	50	25	75
5.	FPM-215	Farm Power and Machinery	4	3	50	25	75
6.	SSC-216	Manures and Fertilizers	4		50	00	50
7.	FSC-217	Production Technology of Fruit Crops	4	3	50	25	75
8.	SSC-218	Soil Physics and Erosion Management	4	3	50	25	75
9.	FST-219	Introduction to Food Science and Post Harvest Value Addition	4	3	50	25	75
10.	ESL-221*	Environmental Studies–I					50
	Total		**36**	**24**	**450**	**200**	**650**

***Note: The marks of ESL-221 & ESL-222 (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		Total Marks		Grand Total
			Th	Prac	Th.	Prac	
1.	AGR-221	Principles of Agronomy-II (Rabi Crops)	4	3	50	25	75
2.	PBG-222	Principles of Seed Technology	4	3	50	25	75
3.	ENT-223	Insect Ecology and Integrated Pest Management	4	3	50	25	75
4.	EXT-224	Extension Methodologies and Communication Skills for Transfer of Technology	4	3	50	25	75
5.	LPM-225	Livestock Production and Management	4	3	50	25	75
6.	AGR-226	Organic Farming	4	3	50	25	75
7.	FCL-227	Flower Cultivation and Landscape Gardening	4	3	50	25	75
8.	SWE 228	Fundamentals of Soil and Water Conservation Engineering	4	3	50	25	75
9.	MGT-229	Fundamentals of Agri-business Management and Entrepreneurship Development	4	0	50	00	50
10.	ESL-222*	Environmental Studies–II	-		50	-	50
	Total		**36**	**24**	**400**	**200**	**650**

***Note: The marks of ESL-221 & ESL-222 (Environmental Studies) will not be added in the total marks.**

B.Sc. AGRICULTURE (HONS.) (SEMESTER SYSTEM)

SEMESTER–V

Sr. no.	Course	Subject	Period Per Week		Marks		Total
			Th.	Prt.	Th.	Prt.	
1.	Agron–302	Practical Crop Production–I *(Kharif Crops)*	0	3	0	25	25
2.	Biotech–310	Principles of Plant Biotechnology	4	3	50	25	75
3.	Chem–302	Chemistry of Agrochemicals, Plant Products and Growth Regulators	2	3	25	25	50
4.	Econ–303	Agricultural Marketing, Trade and Prices	4	3	50	25	75
5.	Ent–302	Insect Pests of Crops and stored Grain	4	3	50	25	75
6.	FT–302	Introduction to Food Science and Post Harvest Value Addition	4	3	50	25	75
7.	Forst–301	Introductory Forestry	4	3	50	25	75
8.	Biochem–301	Elementary Biochemistry	4	3	50	25	75
9.	PBG–303	Principles of Plant Breeding	4	3	50	25	75
		TOTAL:	**30**	**27**	**375**	**225**	**600**

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SEMESTER – VI

Sr. no.	Course	Subject	Period Per Week		Marks		Total
			Th.	Prt.	Th.	Prt.	
1.	Agron–303	Practical Crop Production–II *(Rabi Crops)*	0	3	0	25	25
2.	Mgt.–303	Fundamentals of Agri–business Management and Entrepreneurship Development	4	0	50	00	50
3.	Stat–301	Basic Statistics	4	3	50	25	75
4.	EST–302	Renewable Energy	4	3	50	25	75
5.	Flori.–301	Flower Cultivation and Landscape Gardening	4	3	50	25	75
6.	Pl.Path.–303	Diseases of Horticultural Crops and Their Management	4	3	50	25	75
7.	PBG–304	Breading of Field and Horticulture Crops	4	3	50	25	75
8.	PFE–304	Protected Cultivation and Post Harvest Technology	4	3	50	25	75
9.	Hort.–301	Post Harvest Management of Fruits and Vegetables	4	3	50	25	75
		TOTAL:	**32**	**24**	**375**	**225**	**600**

B.Sc. AGRICULTURE (HONS.) (SEMESTER SYSTEM)

SEMESTER VII

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

Sr. no.	Course Code	Subject	Periods per Week		Total Marks		Grand Total
			Th.	Pract	Th.	Pract.	
1.	FSC-411	Nursery Management of Horticultural Crops	4	6	100	50	150
2.	FSC-412	Fundamentals of Fruit Production	4	-	100		100
3.	VSC-413	Commercial Vegetable Production	4	6	100	50	150
4.	VSC-414	Vegetable Breeding and Seed Production	4	6	100	50	150
5.	STA-405	Principles of Statistics	4	6	80	20	100
6.		Training Project Report (TPR)					150
		Total	**20**	**24**	**480**	**170**	**800**

B.Sc. AGRICULTURE (HONS.) (SEMESTER SYSTEM)

SEMESTER VII

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

Sr . no.	Course Code	Subject	Periods per Week		Total Marks		Grand Total
			Th.	Pract	Th.	Pract.	
1.	AGR 411	Weed Management	4	6	100	50	150
2.	AGR-412	Crop Production under Special Situations	4	-	100		100
3.	SSC-413	Analytical Techniques in Soils, Plants, Fertilizers and Water	4	6	100	50	150
4.	AGR-414	Production Technology of Spices, Aromatic, Medicinal and Plantation Crops	4	6	100	50	150
5.	STA-405	Principles of Statistics	4	6	80	20	100
6.		Training Project Report (TPR)					150
		Total	**20**	**24**	**480**	**170**	**800**

B.Sc. AGRICULTURE (HONS.) (SEMESTER SYSTEM)

SEMESTER-VII

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

Sr. no.	Course Code	Subject	Periods per Week		Total Marks		Grand Total
			Th	Pract	Th	Pract	
1.	EXT-411	Communication and Information Technology	4	6	100	50	150
2.	MGT-412	Financial and Project Management	4	6	100	50	150
3.	EXT-413	Behavioral Skills for Human Resource Development	4	0	100		100
4.	AGE-414	Micro Economic Analysis	4	6	100	50	150
5.	STA-405	Principles of Statistics	4	6	80	20	100
6.		Training Project Report (TPR)					150
		Total	**20**	**24**	**480**	**170**	**800**

B.Sc. AGRICULTURE (HONS.) (SEMESTER SYSTEM)

SEMESTER VII

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

Sr. no.	Course Code	Subject	Periods per Week		Total Marks		Grand Total
			Th.	Pract	Th.	Pract.	
1.	ENT-411	Apiculture	4	6	100	50	150
2.	PPL-412	Post Harvest Diseases and their Management	4	6	100	50	150
3.	ENT-413	Quarantine in Plant Protection	4		100		100
4.	NEM-414	Plant Nematology	4	6	100	50	150
5.	STA-405	Principles of Statistics	4	6	80	20	100
6.		Training Project Report (TPR)				150	150
		Total	**20**	**24**	**480**	**320**	**800**

B.Sc. AGRICULTURE (HONS.) (SEMESTER SYSTEM)

SEMESTER VIII

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER SYSTEM)

SEMESTER VIII

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

Sr. no.	Course Code	Subject	Periods per Week		Total Marks		Grand Total
			Th.	Pract	Th.	Pract.	
1.	AGR-421	Farming Systems and Sustainable Agriculture	4	6	100	50	150
2.	SSC-422	Soil Physical and Biological Environment	4	6	100	50	150
3.	SSC-423	Soil Survey, Classification and Mapping	0	6		50	50
4.	FOR-424	Production Technology of Economic Forest Trees	4	6	100	50	150
5.		Training Project Report (TPR)				150	150
		Total	**12**	**24**	**300**	**350**	**650**

B.Sc. AGRICULTURE (HONS.) (SEMESTER SYSTEM)

SEMESTER VIII

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

Sr. no.	Course Code	Subject	Periods per Week		Total Marks		Grand Total
			Th.	Pract	Th.	Pract.	
1.	MGT-421	Retailing and Supply Chain Management	4	0	100		100
2.	AGE-422	Macro Economic Analysis	4	0	100		100
3.	AGE-423	Economic problems of Agriculture in India	4	6	100	50	150
4.	EXT-424	Visual and Graphic Communication	4	6	100	50	150
5.		Training Project Report (TPR)				150	150
		Total	**16**	**12**	**400**	**250**	**650**

B.Sc. AGRICULTURE (HONS.) (SEMESTER SYSTEM)

SEMESTER -VIII

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

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-I)

AGR–111: 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.

AGM–112: INTRODUCTORY AGRO METEOROLOGY

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:

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 Agro–meteorological 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.

B.Sc. AGRICULTURE (HONS.) (SEMESTER-I)

MBL–113: 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:

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, cyan bacteria, 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.

B.Sc. AGRICULTURE (HONS.) (SEMESTER-I)

SSC–114: 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.

AGE–115: 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:

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–116: 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.

B.Sc. AGRICULTURE (HONS.) (SEMESTER-I)

MAT–116: BASIC MATHS–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)

ENG–117: COMMUNICATION SKILLS IN ENGLISH-I

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. *English Grammar in Use* (Fourth Edition) by Raymond Murphy, CUP

GPB–118: 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. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)
   (ਪ੍ਰੋ. ਮੋਹਨ ਸਿੰਘ, ਅੰਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ, ਸ਼ਿਵ ਕੁਮਾਰ ਬਟਾਲਵੀ, ਸੁਰਜੀਤ ਪਾਤਰ, ਪਾਸ਼)
   ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

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.	**ਆਤਮ ਅਨਾਤਮ** : ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ, ਕਲਾ ਪੱਖ	10 ਅੰਕ
3.	ਪੈਰ੍ਹਾ ਰਚਨਾ : ਤਿੰਨ ਵਿਸ਼ਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਇਕ ਉਤੇ ਪੈਰ੍ਹਾ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇ ।	05 ਅੰਕ
4.	ਪੈਰ੍ਹਾ ਦੇ ਕੇ ਉਸ ਬਾਰੇ ਪੰਜ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ।	05 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

BPB–118: ਮੁੱਢਲੀ ਪੰਜਾਬੀ

(In lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ **ਕੁਲ ਅੰਕ: 50**

ਪਾਠ–ਕ੍ਰਮ

1. ਪੈਂਤੀ ਅੱਖਰੀ; ਪੈਰ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ ਅਤੇ ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਲਗਾਂ ਮਾਤਰਾਂ
2. ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ)
3. (ੳ) ਵਿਸ਼ਰਾਮ ਚਿੰਨ੍ਹਾਂ ਦੀ ਵਰਤੋਂ,
   (ਅ) ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸਣ, ਲਿੰਗ ਅਤੇ ਵਚਨ

ਅੰਕ ਵੰਡ ਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਪੈਂਤੀ ਅੱਖਰੀ ਦੀ ਬਣਤਰ ਅਤੇ ਤਰਤੀਬ ਨਾਲ ਸੰਬੰਧਿਤ ਪ੍ਰਸ਼ਨ। **10 ਅੰਕ**
   (ਦੋ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚੋਂ ਇੱਕ ਕਰਨਾ ਹੋਵੇਗਾ)
   ਕਵਰਗ, ਚਵਰਗ, ਤਵਰਗ, ਟਵਰਗ ਆਦਿ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ ਪੁੱਛਿਆ ਜਾ ਸਕਦਾ ਹੈ। ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ ਅਤੇ ਲਗਾਂ ਮਾਤਰਾਂ ਦੀ ਵਰਤੋਂ ਨਾਲ ਸੰਬੰਧਿਤ ਪ੍ਰਸ਼ਨ (ਦੋ ਵਿਚੋਂ ਇੱਕ ਕਰਨਾ ਹੋਵੇਗਾ) **10 ਅੰਕ**

2. ਬਿੰਦੀ, ਟਿੱਪੀ ਅਤੇ ਅੱਧਕ ਦੀ ਵਰਤੋਂ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ **10 ਅੰਕ**

3. (ੳ) ਵਿਸ਼ਰਾਮ ਚਿੰਨ੍ਹਾਂ ਦੀ ਵਰਤੋਂ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ **10 ਅੰਕ**
   (ਅ) ਨਾਂਵ ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ ਅਤੇ ਲਿੰਗ ਵਚਨ ਸੰਬੰਧੀ ਮੁੱਢਲੀ ਕਿਸਮ ਦੇ ਪ੍ਰਸ਼ਨ (ਦੋ ਵਿਚੋਂ ਇੱਕ ਕਰਨਾ ਹੋਵੇਗਾ) **10 ਅੰਕ**

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

VSC–121: 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.

BCH–122: ELEMENTARY BIOCHEMISTRY

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:

General Introduction and importance.Carbohydrates, Amino acids and proteins . Plant proteins and their quality. Enzymes–classification, factors affecting activity, immobilization and other industrial application. Lipids– their industrial applications, Glycolysis. Citric acid Cycle, Pentose phosphate pathway.Oxidative phosphorylation, fatty acid oxidation.. Biosynthesis– Carbohydrates, lipids, proteins and nucleic acids. Minerals and Vitamins

Practical:.

Preparation of Standards solutions of acid and alkali. Determination of pH using indicators with pH meter. Determination of moisture in a given sample. Determination of ash in a given sample. Determination of acidity in a given sample. Estimation of fat by Soxhlet method. Estimation of free fatty acid of given sample. Determination of total solids in the given food products. Determination of crude fibre in the given food.

B.Sc. AGRICULTURE (HONS.) (SEMESTER-II)

FOR–123: INTRODUCTORY FORESTRY

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:

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. Agro forestry, 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, shish am, mulberry, kikar, sagwan, dek, bamboo and subabul.

SSC–124: 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)

PBG–125: 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)

ZOO–126: 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)

MAT–126: BASIC MATHS–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)

ENG–127: COMMUNICATION SKILLS IN ENGLISH-II

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

   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 exercises 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 invitations and ask the students to accept or refuse it etc.

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

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.

GPB–128: 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. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ) (ਕਹਾਣੀਆਂ)
   ਪਠਾਣ ਦੀ ਧੀ (ਸੁਜਾਨ ਸਿੰਘ), **ਸਾਂਵੀ ਕੰਧ** (ਸੰਤੋਖ ਸਿੰਘ ਧੀਰ), **ਉਜਾੜ** (ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ), **ਘੋਟਣਾ** (ਮੋਹਨ ਭੰਡਾਰੀ), **ਦਲਦਲ** (ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)
   ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

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.	**ਆਤਮ ਅਨਾਤਮ** : ਸਾਰ, ਵਿਸ਼ਾ ਵਸਤੂ, ਪਾਤਰ ਚਿਤਰਣ, 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

BPB–128: ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(In lieu of Compulsory Punjabi)

ਸਮਾਂ: 3 ਘੰਟੇ **ਕੁਲ ਅੰਕ: 50**

ਪਾਠ – ਕ੍ਰਮ

1. ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ
   ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ
   ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ **20 ਅੰਕ**
2. ਭਾਸ਼ਾ ਅਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ
   ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ **15 ਅੰਕ**
3. ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ
   ਸਾਧਾਰਨ ਵਾਕ: ਕਿਸਮਾਂ
   ਸੰਯੁਕਤ ਵਾਕ: ਕਿਸਮਾਂ
   ਮਿਸ਼ਰਤ ਵਾਕ: ਕਿਸਮਾਂ
   ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਰਤੋਂ ਦੇ ਵਿਭਿੰਨ ਸਮਾਜਿਕ ਪ੍ਰਸੰਗ **15 ਅੰਕ**

ਯੂਨਿਟ ਅਤੇ ਥੀਮ

1. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ:** ਸੰਯੁਕਤ ਸ਼ਬਦ; ਸਮਾਸੀ ਸ਼ਬਦ (ਜਿਵੇਂ ਲੋਕ ਸਭਾ); ਦੋਹਰੇ ਸ਼ਬਦ / ਦੁਹਰਰੁਕਤੀ (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 ਸੰਬੰਧਿਤ ।

2. I. ਭਾਸ਼ਾ ਅਤੇ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਮਹੱਤਵ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ
   II. ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ

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

ਅੰਕ–ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. 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।
   20 ਅੰਕ
2. ਦੂਸਰੇ ਯੂਨਿਟ ਵਿੱਚ ਭਾਸ਼ਾ ਅਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਮੁਢਲੀ ਜਾਣ ਪਛਾਣ ਨਾਲ ਸੰਬੰਧਿਤ 5-5 ਅੰਕਾਂ ਦੇ ਤਿੰਨ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇੱਕ-ਇੱਕ ਜਾਂ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ। **15 ਅੰਕ**
3. ਤੀਜੇ 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।
   ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਭਾਸ਼ਾ ਸਰਲ ਅਤੇ ਸਪਸ਼ਟ ਰੱਖੀ ਜਾਵੇ। **15 ਅੰਕ**

CSE–129: 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-III)

AGR-211: PRINCIPLES OF AGRONOMY–I (KHARIF 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.

Theory:

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 pudding. 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- 212: 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.

Theory:

Introduction and importance of crop physiology in agriculture. Seed structures, morpo-physiological and biochemical changes during seed development. Physiological and harvestable maturity. Seed germination 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, defiency and toxicity symptoms and hydroponics. Photoperiodism and vernalisation. Plant growth regulators-occurrence, biosynthesis, mode of action and commercial applications. Senecence and abscission. Fruit ripening and its hormonal regulation.

Practical:

Seed structure, germination and seed dormacy. 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-213: 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.

Theory:

- Entomology- definition and its history.
- Factors for insect abundance.
- Integument, moulting, body regions and segmentation.
- Morphology and anatomy of an insect (Ak Grasshopper).
- 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 general characters of following orders and their families of agricultural importance-

  Odonata, Orthoptera, Dictyoptera, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera

B.Sc. AGRICULTURE (HONS.) (SEMESTER-III)

EXT-214: 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. Introduction and importance of rural sociology in agricultural extension. Indian rural society. Teaching- learning process. Principles of learning and their implications for teaching.

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-III)

FPM- 215: 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.

Theory:

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 tranplanters, 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 taractors, 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 parts, 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)

SSC-216: MANURES AND FERTILIZERS

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

Theory: 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.

Theory:

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)

FSC-217: 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.

Theory:

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)

SSC-218: 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.

Theory:

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)

FST-219: INTRODUCTION TO FOOD SCIENCE AND POST-HARVEST VALUE ADDITION

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

Theory: 50

Practical: 25

P**eriods 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:

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-III)

ESL–221: ENVIRONMENTAL STUDIES–I (COMPULSORY)

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

Theory Lectures: 1½ Hours/ Week

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.

5. National Service Scheme

- **Introduction and Basic Concepts of NSS:** History, philosophy, aims & objectives of NSS; Emblem, flag, motto, song, badge etc.; Organizational structure, roles and responsibilities of various NSS functionaries.
- **Health, Hygiene & Sanitation:** Definition, needs and scope of health education; Food and Nutrition; Safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan); National Health Programme; Reproductive health.

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)

AGR-221: 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.

Theory:

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)

PBG-222: 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.

Theory:

Importance of seed production. Certified, foundation and breeder seed production. Maintenance of genesis 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, synthesis 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. Principal 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 organizational set up.

Practical:

Seed sampling principles and procedures. Determination of physical purity, germination moisture, viability, seed health and seed vigour of field and horticulture crops. Seed dormacy 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.

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

ENT-223: 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.

Theory:

- Insect Ecology- Introduction, environment and its components,
- Effect of abiotic and biotic factors.
- Biotic potential, environmental resistance and causes for pest outbreaks in agroecosystem.
- 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.

ENT-223: INSECT ECOLOGY AND INTEGRATED PEST MANAGEMENT

Practical:

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

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

EXT-224: 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.

Theory:

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 – IV)

LPM-225: 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.

Theory:

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)

AGR- 226: 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.

Theory:

(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.

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

FCL-227: FLOWER CULTIVATION AND LANDSCAPE GARDENING

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

Theory: 50

Practical: 25

P**eriods per week 4+3**

Instructions for the paper setters

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

Theory:

Introduction to 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 – IV)

SWE-228: 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.

Theory:

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 calculations. Irrigation water measurement-weirs, flumes and orifices. Water conveyance systems-open channel and underground pipeline. Sureface, 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.

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

MGT-229: FUNDAMENTALS OF AGRI. BUSINESS MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT

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

Theory: 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.

Theory:

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 – IV)

ESL–222: ENVIRONMENTAL STUDIES–II (COMPULSORY)

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

Theory Lectures: 1½ Hours/ Week

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. National Service Scheme

- **Entrepreneurship Development:** Definition & Meaning; Qualities of good entrepreneur; Steps/ ways in opening an enterprise; Role of financial and support service Institutions.
- **Civil/Self Defense:** Civil defense services, aims and objectives of civil defense; Needs for self defense training.

5. 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.
- Contribution of the student to NSS/any other social cause for service of society.

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**
Periods Per Week: 03

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: 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.
2. Not more than one question should be based on one topic.
3. The question paper should 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.

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: 25

Practical: 25

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: 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–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: 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. 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: 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.

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: 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.

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: 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.

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.

B.Sc. AGRICULTURE (HONS.) (SEMESTER-V)

PBG–303: PRINCIPLES OF PLANT BREEDING

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 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.

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VI)

AGRON-303: PRACTICAL CROP PRODUCTION–II (*RABI CROPS*)

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

Periods Per Week: 03

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 **Theory: 50**

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.

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: 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.

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: 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.

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: 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.

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: 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. 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: 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 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: 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.

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: 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. 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. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

FSC-411: NURSERY MANAGEMENT OF HORTICULTURAL CROPS

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

Theory: 100

Practical: 50

Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

FSC-412: FUNDAMENTALS OF FRUIT PRODUCTION

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

Theory:

Climatic classification of fruits in Punjab & India. Climate as a limiting factor in Horticulture, Principles of orchard planning, selection of site for establishing an orchard. Winter killing and hardiness. Protection of fruit against adverse climatic conditions. Water requirement of fruit crops and factors influencing it. Critical period of water supply, wilting point, wilting co-efficient and wilting of fruit plants under field 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.

Problems of pollination and fruit set. Factors associated with fruit setting and development of fruits.(Internal & External factors). Role of growth regulators in fruit set, fruit development and maturity of fruits.

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

VSC-413: COMMERCIAL VEGETABLE PRODUCTION

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

Theory: 100

Practical: 50

Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

VSC-414: VEGETABLE BREEDING AND SEED PRODUCTION

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

Theory: 100

Practical: 50

Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

STA-405: PRINCIPLES OF STATISTICS

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Practical: 20
Periods per Week 4+6

Instructions for the paper setters:

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

Theory: Analysis of time series data, estimation of linear trend, 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. 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.

Practical:

1. Fitting of linear trend to time –series data.
2. Fitting of exponential trend to time –series data.
3. Calculation of index numbers.
4. Test of significance for single mean in small and large samples.
5. Test of significance for difference of means in small and large samples.
6. Analysis of variance one way and two way.
7. Analysis of completely randomised design.
8. Analysis of randomized block design.
9. Analysis of Latin square design.
10. Analysis of RBD with one missing value.
11. Analysis of LSD with 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.) (SEMESTER-VII)

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

Training Project Report (TPR)

Training components and schedule…..

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)
AGR-411: WEED MANAGEMENT

Time: 3 Hours **Max. Marks: 150**
Theory: 100
Practical: 50
Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

AGR-412: CROP PRODUCTION UNDER SPECIAL SITUATIONS

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

Instructions for the paper setters

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

Theory:

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

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

SSC-413: ANALYTICAL TECHNIQUES IN SOILS, PLANTS, FERTILIZERS AND WATER

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

Theory: 100

Practical: 50

Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

AGR-414: PRODUCTION TECHNOLOGY OF SPICES, AROMATIC, MEDICINAL AND PLANTATION CROPS

Time: 3 Hours **Max. Marks: 150**
Theory: 100
Practical: 50
Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE CROP SCIENCE

(Agronomy, Soil Science & Agroforestry)

STA-405: PRINCIPLES OF STATISTICS

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

Theory: 80

Practical: 20

Periods per Week 4+6

Instructions for the paper setters:

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

Theory: Analysis of time series data, estimation of linear trend, 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. 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.

Practical:

1. Fitting of linear trend to time –series data.
2. Fitting of exponential trend to time –series data.
3. Calculation of index numbers.
4. Test of significance for single mean in small and large samples.
5. Test of significance for difference of means in small and large samples.
6. Analysis of variance one way and two way.
7. Analysis of completely randomised design.
8. Analysis of randomized block design.
9. Analysis of Latin square design.
10. Analysis of RBD with one missing value.
11. Analysis of LSD with 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.) (SEMESTER-VII)

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

Training Project Report (TPR)

Training components and schedule…..

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

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

EXT-411: COMMUNICATION AND INFORMATION TECHNOLOGY

Time: 3 Hours **Max. Marks: 150**
Theory: 100
Practical: 50
Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

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

MGT-412: FINANCIAL AND PROJECT MANAGEMENT

Time: 3 Hours **Max. Marks: 150**
Theory: 100
Practical: 50
Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

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

EXT-413: BEHAVIORAL SKILLS FOR HUMAN RESOURCE DEVELOPMENT

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

Instructions for the paper setters

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

Theory:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

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

AGE-414: MICRO ECONOMIC ANALYSIS

Time: 3 Hours **Max. Marks: 150**
Theory: 100
Practical: 50
Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

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

STA-405: PRINCIPLES OF STATISTICS

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Practical: 20
Periods per Week 4+6

Instructions for the paper setters:

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

Theory: Analysis of time series data, estimation of linear trend, 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. 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.

Practical:

1. Fitting of linear trend to time –series data.
2. Fitting of exponential trend to time –series data.
3. Calculation of index numbers.
4. Test of significance for single mean in small and large samples.
5. Test of significance for difference of means in small and large samples.
6. Analysis of variance one way and two way.
7. Analysis of completely randomised design.
8. Analysis of randomized block design.
9. Analysis of Latin square design.
10. Analysis of RBD with one missing value.
11. Analysis of LSD with 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.) (SEMESTER-VII)

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

Training Project Report (TPR)

Training components and schedule…..

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE CROP PROTECTION
(Entomology, Plant Pathology & Nematology)

ENT-411: APICULTURE

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

Theory: 100

Practical: 50

Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE CROP PROTECTION
(Entomology, Plant Pathology & Nematology)

PPL-412: POST HARVEST DISEASES AND THEIR MANAGEMENT

Time: 3 Hours **Max. Marks: 150**
Theory: 100
Practical: 50
Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE CROP PROTECTION
(Entomology, Plant Pathology & Nematology)

ENT-413: QUARANTINE IN PLANT PROTECTION

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

Theory:

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE CROP PROTECTION
(Entomology, Plant Pathology & Nematology)

NEM-414: PLANT NEMATOLOGY

Time: 3 Hours **Max. Marks: 150**
Theory: 100
Practical: 50
Periods per Week 4+6

Instructions for the paper setters

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

Theory:

History and economic importance of plant parasitic nematodes. General characteristics, identification, their classification and relationship with other organisms. Morphology and biology of important genera, namely Meloidogyne, Heterodera, Globodera, Anguina, Rotylenchulus, Ditylenchus, Tylenchulus, Pratylenchus, Radopholus and virus vectors. Principles and methods of control.

Practical:

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

B.SC. AGRICULTURE (HONS.) (SEMESTER-VII)

ELECTIVE CROP PROTECTION
(Entomology, Plant Pathology & Nematology)

STA-405: PRINCIPLES OF STATISTICS

Time: 3 Hours **Max. Marks: 100**
Theory: 80
Practical: 20
Periods per Week 4+6

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

Theory: Analysis of time series data, estimation of linear trend, 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. 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.

Practical:
1. Fitting of linear trend to time –series data.
2. Fitting of exponential trend to time –series data.
3. Calculation of index numbers.
4. Test of significance for single mean in small and large samples.
5. Test of significance for difference of means in small and large samples.
6. Analysis of variance one way and two way.
7. Analysis of completely randomised design.
8. Analysis of randomized block design.
9. Analysis of Latin square design.
10. Analysis of RBD with one missing value.
11. Analysis of LSD with 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.) (SEMESTER-VII)

ELECTIVE CROP PROTECTION
(Entomology, Plant Pathology & Nematology)

Training Project Report (TPR)

Training components and schedule…..

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER VIII)

ELECTIVE HORTICULTURE

(Fruit Science, Vegetable Science & Floriculture)

FSC-421: COMMERCIAL FRUIT PRODUCTION

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

Theory: 100

Practical: 50

Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER VIII)

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

FSC-422: PROCESSING AND VALUE ADDITION OF HORTICULTURAL CROPS

Time: 3 Hours **Max. Marks: 100**
Theory: 75
Practical: 25
Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER VIII)

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

VSC-423: FORCING TECHNIQUES IN VEGETABLE PRODUCTION

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

Theory: 75

Practical: 25

Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical: **Time: 3 Hours**

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER VIII)

ELECTIVE HORTICULTURE
(Fruit Science, Vegetable Science & Floriculture)

FCL-424: COMMERCIAL FLORICULTURE AND LANDSCAPING

Time: 3 Hours **Max. Marks: 150**
Theory: 100
Practical: 50
Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER VIII)

ELECTIVE HORTICULTURE

(Fruit Science, Vegetable Science & Floriculture)

Training Project Report (TPR)

Training components and schedule…..

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

AGR-421: FARMING SYSTEMS AND SUSTAINABLE AGRICULTURE

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

Theory: 100

Practical: 50

Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

SSC-422: SOIL PHYSICAL AND BIOLOGICAL ENVIRONMENT

Time: 3 Hours **Max. Marks: 150**
Theory: 100
Practical: 50
Periods per Week 4+6

Instructions for the paper setters:

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

Theory:

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

SSC-423: SOIL SURVEY, CLASSIFICATION AND MAPPING

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

Instructions for the paper setters

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

FOR-424: PRODUCTION TECHNOLOGY OF ECONOMIC FOREST TREES

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

Theory: 100

Practical: 50

Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

ELECTIVE CROP SCIENCE
(Agronomy, Soil Science & Agroforestry)

Training Project Report (TPR)

Training components and schedule…..

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

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

MGT-421: RETAILING AND SUPPLY CHAIN MANAGEMENT

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

Instructions for the paper setters

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

Theory:

Introduction to retailing- definition, concept and overview. Types of retail institutions related to agri- business. Changing food consumption patterns in India. Store location and site selection. Managing retail operations procurement and inventory management. Store design- the exterior, interior, layout and display. Promoting store. Introduction to customer relationship management in retail business. Supply chain management concept, definition and importance. Elements of physical distribution systems, building and operating supply chains in agribusiness. Role of IT in supply chain management.

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

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

AGE-422: MACRO ECONOMIC ANALYSIS

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

Instructions for the paper setters

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

Theory:

Macro Economics: meaning, definition, importance, limitations, scope and integration of micro and macro analysis. Basic macroeconomic concepts. National income: meaning, definition, types, measurement and social accounting. Circular flow of money. Simple Keynesian model of income determination, shifts in aggregate demand. Multiplier. Theories of consumption and investment. Income determination model including money and interest. Monetary policy: meaning, instruments, indicators, lags and effectiveness. Fiscal policy: meaning, definition, different tools and limitations. Wage and employment policies: meaning, need, demand and supply of labor, measures of full employment, relationship between level of employment and output. Inflation and recession: process, causes, types and remedies. Introduction to Indian economy and comparison with other related economies. Significant economic problems in Indian agriculture relating to agricultural production and productivity, credit, marketing, labor and environment.

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

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

AGE-423: ECONOMIC PROBLEMS OF AGRICULTURE IN INDIA

Time: 3 Hours **Max. Marks: 150**
Theory: 100
Practical: 50
Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

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

EXT-424: VISUAL AND GRAPHIC COMMUNICATION

Time: 3 Hours **Max. Marks: 150**
Theory: 100
Practical: 50
Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

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

Training Project Report (TPR)

Training components and schedule…..

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

ELECTIVE CROP PROTECTION
(Entomoloty, Plant Pathology & Nematology)

PPL- 421: BIOCONTROL AND INTEGRATED DISEASE MANAGEMENT

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

Theory: 100

Practical: 50

Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

ELECTIVE CROP PROTECTION
(Entomoloty, Plant Pathology & Nematology)

ENT-422: BIOCONTROL AND INTEGRATED PEST MANAGEMENT

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

Theory: 100

Practical: 50

Periods per Week 4+6

Instructions for the paper setters

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

Theory:

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

ELECTIVE CROP PROTECTION
(Entomoloty, Plant Pathology & Nematology)

ENT-423: PESTICIDES AND PLANT PROTECTION EQUIPMENT

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

Theory: 100

Practical: 50

Periods per Week 4+6

Instructions for the paper setters

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Theory:

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

ELECTIVE CROP PROTECTION
(Entomoloty, Plant Pathology & Nematology)

PPL-424: PLANT DISEASE DIAGNOSIS

Time: 3 Hours **Max. Marks: 50**
Practical: 50
Periods per Week 6

Instructions for the paper setters

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

Practical:

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

B.Sc. AGRICULTURE (HONS.) (SEMESTER-VIII)

ELECTIVE CROP PROTECTION
(Entomoloty, Plant Pathology & Nematology)

Training Project Report (TPR)

Training components and schedule…..

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