

**PUNJABI UNIVERSITY PATIALA**

Scheme of Studies and Examinations for the

Session : 2017-18, 2018-19 and 2019-20

**B.Sc.(Hons. in Agriculture) III<sup>rd</sup> Semester**

PAPER NO.	SUBJECT	THEORY		PRACTICAL	TOTAL
		EXTERNAL	INTERNAL		
ENTO-201	FUNDAMENTALS OF ENTOMOLOGY	45	15	40	100
HORT-201	PRODUCTION TECHNOLOGY OF FRUIT CROPS	45	15	40	100
AGRON-201	CROP PRODUCTION TECHNOLOGY -I (KHARIF CROPS)	45	15	40	100
GPB-201	PRINCIPLE OF PLANT BREEDING	45	15	40	100
AGRI ENG - 201	FARM MACHINERY AND POWER	45	15	40	100
SOIL-201	MANURES, FERTILIZERS AND SOIL FERTILITY MANAGEMENT	45	15	40	100
BOT-201	FUNDAMENTALS OF CROP PHYSIOLOGY	45	15	40	100
PUN-201/	PUNJABI COMPULSORY(FOR PUNJAB STATE STUDENT)/PUNJABI	75	25	-	100
BPB-201	MUDLAGYAN (FOR OTHER STATE STUDENTS)	75	25	-	
PEP-201	ELEMENTARY PUNJABI (FOR OTHER STATE STUDENTS /FOR FOREIGN STUDENTS)	50	20	30	
<b>Total</b>					<b>800</b>

**B.Sc.(Hons. in Agriculture) IV<sup>th</sup> Semester**

PAPER NO.	SUBJECT	THEORY		PRACTICAL	TOTAL
		EXTERNAL	INTERNAL		
AGRON- 202	CROP PRODUCTION TECHNOLOGY –II (RABI CROPS)	45	15	40	100
GPB -202	PRINCIPLES OF SEED TECHNOLOGY	45	15	40	100
ENT-202	PESTS OF CROPS AND STORED GRAIN AND THEIR MANAGEMENT	45	15	40	100
LPM-201	LIVESTOCK PRODUCTION AND POULTRY MANAGEMENT	45	15	40	100
AGRI ENG - 202	SOIL AND WATER CONSERVATION ENGINEERING	45	15	40	100
HORT-202	PRODUCTION TECHNOLOGY FOR VEGETABLE CROPS	45	15	40	100
PATH-202	DISEASE OF FIELD CROPS AND THEIR MANAGEMENT	45	15	40	100
PUN-202/	PUNJABI COMPULSORY (FOR PUNJAB STATE STUDENT)	75	25	-	100
BPB-202	PUNJABI MUDLAGYAN (FOR OTHER STATE STUDENTS)	75	25	-	
PEP-202	ELEMENTARY PUNJABI (FOR OTHER STATE STUDENTS /FOR FOREIGN STUDENTS)	50	20	30	
EVS-202	ENVIRONMENTAL & ROAD SAFETY AWARENESS (QUALIFYING PAPER)	70	30	-	100 (QUALIFYING PAPER)
<b>Total</b>					<b>800</b>

**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**ENTO-201: Fundamentals of Entomology**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**SECTION A**

1. History of Entomology in India. Factors for insect's abundance.
2. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes.
3. Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order.
4. Effect of abiotic factors–temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents.Effect of biotic factors – food competition, natural and environmental resistance. Concepts of Balance of life in nature, biotic potential and environmental resistance and causes for outbreak of pests in agro-ecosystem.

**SECTION B**

1. Morphology: Structure and functions of insect cuticle and molting.
2. Body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling

apparatus. Structure of male and female genital organ. Major sensory organs like simple and compound eyes, chemoreceptor.

3. Metamorphosis and diapause in insects. Types of larvae and pupae.
4. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive system, in insects. Types of reproduction in insects.

### **PRACTICAL**

**Max. Marks: 40**

**Time allowed: 3 Hours**

#### **Practical**

1. Methods of collection and preservation of insects including immature stages.
2. External features of Grasshopper/Blister beetle; Types of insect antennae, mouthparts and eggs; Wing venation, types of wings and wing coupling apparatus.
3. Types of insect larvae and pupae.
4. Dissection of digestive system in insects (Grasshopper).
5. Dissection of male and female reproductive systems in insects (Grasshopper).
6. Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance.

#### **BOOKS RECOMMENDED**

- |                             |   |  |
|-----------------------------|---|--|
| Mani, M.S.                  | : | <i>General Entomology</i> , Oxford & IBH, New Delhi                                    |
| Ross, H.H.                  | : | <i>A text book of Entomology</i> , John Willen and Sons                                |
| Imms. A.D.                  | : | <i>Outlines of Entomology</i> , Chapman & Hall London                                  |
| Atwal A.S.                  | : | <i>Insect Pests of South East Asia</i> , Kalyani Publishers, New delhi                 |
| Narayan, K.K.               | : | <i>General &amp; Applied Entomology</i> , Tata McGraw Hill, New Delhi                  |
|                             | : | <i>Insects Structure and Function</i> , English  |
| Chapman R.F.                | : | <i>Language Books Society</i>  |
| Pruthi. H.S.                | : | <i>A Text Book of Entomology</i>   |
| Metcalf, R.H.               | : | <i>Destructive and Useful Insect</i> , Mc Graw Hill Book Comp.                         |
| Mishra, R.C                 | : | Honey bees and their Management, ICAR Publication, New Delhi                           |
| Gatoria G.S and Goyal Tarun | : | A Practical manual on Agri-Zoo. And Entomology for B.Sc Agriculture BFC Deon, Bathinda |

**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**HORT-201: PRODUCTION TECHNOLOGY OF FRUIT CROPS**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**Theory:**

**SECTION A**

1. Definition, importance and divisions of horticulture. Climatic zones of India, area and production of different fruit crops in India.
2. Selection of site for orchard, use of fencing and wind break. Planting systems, high density planting, planning and establishment of an orchard.
3. Propagation methods and use of rootstocks. Methods of training and pruning.
4. Use of growth regulators in increasing of fruit production.

**SECTION B**

1. Package of practices for the cultivation of – Major fruits –mango, banana, citrus, grapes, Guava,
2. Package of practices for the cultivation of Sapota, apple, litchi and papaya.
3. Package of practices for the cultivation of Minor fruits – pineapple, pomegranate, ber, fig, jackfruit.
5. Package of practices for the cultivation of pear, plum, peaches, apricot and cherry.

## PRACTICAL

Max. Marks: 40

Time allowed: 3 Hours

### Practical:

1. Horticultural tools and their uses.
2. Containers and potting mixtures. Plant and seed propagation,
3. Layout and planting systems. Methods of pruning and training.
4. Training of ber, grape and pomegranate. Pruning of ber, grape,
5. Identification of important species and varieties of fruits.
6. Methods of irrigation including drip and micro irrigation.
7. Methods of fertilizer application. Preparation of growth regulators for fruit production
8. Application of growth regulators for improving fruit set, fruit size, quality, delaying and hastening ripening.
9. Visit to local commercial orchards.

### BOOKS RECOMMENDED

- Hayes, W.P. : *Fruits Growing in India*, Kitabstan, Allahabad
- Singh Ranjit : *Fruits*
- Lal Girdhari & Siddappe : *Preservation of Fruits & Vegetables*, ICRA, New Delhi
- Tandon
- Nagi Malkiat : *Home Preservation of Fruits & Vegetables*, PAU, Ludhiana
- Bal, J.S : *Fruit Growing*
- Chatopadhye, T.K. : *A Text Book of Pomology (Vol.I)*
- Jitender Singh : *Horticultural Terminology*
- Chadha, K.L. : *Handbook of Horticulture (ICAR)*

**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**AGRON-201: Crop Production Technology-I (Kharif Crops)**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**SECTION A**

1. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Cereals – Rice and Maize
2. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Pearl millet and Finger millet
3. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield pulses - Pigeon pea, Moongbean and Urdbean
4. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield- oilseeds- Groundnut, and Soybean

**SECTION B**

1. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield fiber crops- Cotton and Jute
2. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of forage crops- Napier and Sorghum

3. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Cowpea and Cluster bean
4. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Kodo.

### **PRACTICAL**

**Max. Marks: 40**

**Time allowed: 3 Hours**

#### **Practical**

1. To study the major season field crops.
2. Name of field crop books, authors and publishers.
3. Scientific name and family of kharif crops.
4. To study about the growth stages and morphology of Rice crop.
5. Identification of weeds in kharif season.
6. To find out the seed rate of kharif crops.
7. To calculate the yield of Rice, Maize, Pigeon pea and Groundnut.
8. To calculate dose of fertilizer in Kharif crop.
9. Study of crop varieties and important agronomic experiments at experimental farm.
10. Visit to research centers of related crops.

#### **Books Recommended**

1. Prasad, R. Field crops Vol.I &II publisher by ICAR
2. Pearson : Handbook of Agriculture ICAR, New Delhi.
3. Fugh B.M : Production of field Crops in India, Kitabistan, Allabhabad
4. Harlison C.M : Field Crops, Mc Graw Hill Book Co., New Delhi.
5. P.A.U Bulletin: Package of practices for Rabi Crops.
6. P.A.U Bulletin: Package of practices for Kharif Crops.
7. Chhidda Singh, Prem Singh &: Modern techniques of raising field Crops.
8. Rajbir Singh Reddy S.R: Agronomy of Field Crops



**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**GPB-201: Principles of Plant Breeding**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**SECTION A**

**THEORY**

1. Historical development, concept, nature and role of plant breeding, major achievements and future prospects
2. Genetics in relation to plant breeding, modes of reproduction and apomixes, self – incompatibility male sterility and their uses and system of mating.
3. Domestication, Acclimatization, introduction; Centre of origin, component of Genetic variation, Genetic basis and breeding methods in self- pollinated crops mass and pure line selection bulk, pedigree and back cross method, hybridization techniques.
4. Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops; Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties

## SECTION B

1. Breeding methods in asexually propagated crops, clonal selection and hybridization, Wide hybridization and pre-breeding;
2. Polyploidy in relation to plant breeding, mutation breeding for crop improvement
3. Breeding biotic (disease resistance) and abiotic stresses (drought resistance)  
Biotechnological tools-DNA markers and marker assisted selection.
4. Participatory plant breeding; Plant Breeders and Farmer's Rights. Collaboration of Plant Breeders/ farmers with private breeders/farmers.

## PRACTICAL

**Max. Marks: 40**

**Time allowed: 3 Hours**

### Practical

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

### BOOKS RECOMMENDED

1. Hayes, Immar & Smith : Methods of Plant Breeding
2. Poelhlman J.M. & Borthakur : Breeding of Asian Field Crops
3. Singh B.D. : Plant Breeding- Principles and Methods
4. Singh B.D : A Text book of Plant Breeding
5. Singh Phundan : Essentials of Plant Breeding
6. Chahal G.S and Gosal S.S :Principles and procedure of Plant *Breeding, Biotechnological and conventional approaches*

**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**AGRIENG-201: Farm Machinery and Power**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**SECTION A**

1. Status of Farm Power in India, Sources of Farm Power, Internal Combustion (I.C). Engines, working principles of I C engines technology.
2. Comparison of two stroke and four stroke cycle engines, Study of different components of I.C. engine, I.C. engine terminology and solved problems.
3. Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor
4. Familiarization with Power transmission system: clutch, gear box, differential and final drive of a tractor, Tractor types, Cost analysis of tractor power and attached implement.

**SECTION B**

1. Familiarization with Primary and Secondary Tillage implements, Implements for hill agriculture, implements for intercultural operations
2. Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples
3. Familiarization with Plant Protection equipments. Familiarization with harvesting and threshing equipment.

4. Implements for intercultural operations, seed drills, paddy transplanter, their calibrations. Plant protection. Harvesting and threshing equipment. Cost of operation of tractor and machinery.

## **PRACTICAL**

**Max. Marks: 40**

**Time allowed: 3 Hours**

### **Practicals**

1. Study of different components of I.C. engine.
2. To study air cleaning and cooling system of engine.
3. Familiarization with clutch, transmission, differential and final drives of a tractor.
4. Familiarization with lubrication and fuel supply system of engine.
5. Familiarization with brake, steering, hydraulic control system of engine, learning of tractor driving.
6. Familiarization with operation of power tiller, Implements for hill agriculture.
7. Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow.
8. Familiarization with seed-cum-fertilizer drills their seed metering mechanism and calibration, planters and transplanter Familiarization with different types of sprayers and dusters Familiarization with different inter-cultivation equipment.
9. Familiarization with harvesting and threshing machinery.

### **BOOKS RECOMMENDED**

1. OJha, T.P : Principles of Agri. Vol. –I Jain Brothers, Publishers, New Delhi
2. . Michale, A.M : Farm Power and Machinery, Kitab Mahal, Allahabad.
3. Smith Kanis Person : Farm Machinery and Equipments; Tata Mc Graw Hill Publishing Co. New Delhi. Wills L. Hang : Agri. Engg. Land Surveying, Tata McGraw Hill Publishing Co. New Delhi.
4. Jain,S.C. and Rai,C.R. : Tractor Engine.

**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**SOIL-201: Manures, Fertilizers and Soil Fertility Management**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**Theory**

**SECTION A**

1. Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures.
2. Green/ leaf manuring. Compost from farm and town refuse. Methods of composting, vermicompost and biofertilizers. Integrated nutrient management.
3. Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers.
4. Secondary & micronutrient fertilizers, Complex fertilizers, methods of fertilizers application, Soil amendments, Fertilizer Storage, Fertilizer Control Order.

**SECTION B**

1. History of soil fertility and plant nutrition. Criteria of essentiality.
2. Role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Factor influencing nutrient use efficiency (NUE)

3. Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients.
4. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, and rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops.

### **PRACTICAL**

**Max. Marks: 40**

**Time allowed: 3 Hours**

#### **Practical**

1. Methods of composting,
2. Methods of vermicompost
3. Methods of fertilizers application,
4. Introduction of analytical instruments. and their principles
5. Estimation of available N in soils.
6. Estimation of available P in soils.
7. Estimation of available K in soil.
8. Estimation of N in plants.
9. Estimation of P in plants.
10. Estimation of K in plants.

### **BOOKS RECOMMENDED**

1. Brady, Nyle CC: The Nature and Properties of Soil .McMillan Publishing Co., New Delhi.
2. Tenhane R.V. Motiramani, : Soil Theory Chemistry and Fertility
3. D.P., Bali V.P & in Tropical Asia. Prentice Hall of India, New Delhi.
4. Roth, H.D., and Truk L.H. : Fundamentals of Soil Science. • Wiley Eastern Pvt.Ltd., New Delhi.
5. Yawlkar, K.S. Aggarwal, J.P : Manures • & Fertilizer-Agri/ KA Balkele S. Pulishing Co.Nagpur.
6. Ranjan Kumar Basak : Fertilizers: A Text Book

**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**BOT-201: Fundamentals of Crop Physiology**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**Theory**

**SECTION A**

1. Introduction to crop physiology and its importance in Agriculture.
2. Plant cell: an Overview, water relations in plants: role of water in plant metabolism, osmosis, water potential and its components, absorption of water, mechanisms of absorption, ascent of sap.
3. Stomata, structure, distribution, classification, mechanism of opening and closing of stomata, guttation, transpiration, and factors affecting transpiration.
4. Different types of stresses, water, heat and cold tolerance, mechanism of tolerance. Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanism.

**SECTION B**

1. Photosynthesis: importance of photosynthesis, factors affecting the photosynthesis. Light and Dark reactions, C<sub>3</sub>, C<sub>4</sub> and CAM plants.

2. Respiration: Glycolysis, TCA cycle and electron transport chain, ATP synthesis and factors affecting the respiration.
3. Fat Metabolism: Fatty acid synthesis and breakdown; Plant growth regulators: Physiological roles and agricultural uses.
4. Physiological aspects of growth and development of major crops: Growth analysis, Role of Physiological growth parameters in crop productivity.

## **PRACTICAL**

**Max. Marks: 40**

**Time allowed: 3 Hours**

### **Practical**

1. Study of structure and distribution of stomata.
2. Osmosis demonstration, Plasmolysis-demonstration.
3. Determination of diffusion pressure deficit of losses.
4. Measurement of root pressure, rate of transpiration.
5. Separation of photosynthetic pigments through paper chromatography.
6. Rate of transpiration, photosynthesis, respiration, tissue test for mineral nutrients.
7. Estimation of relative water content, Measurement of photosynthetic CO<sub>2</sub> assimilation by Infra Red Gas Analyser (IRGA).

### **Books Recommended**

1. J.B. Salisbury and L.W. Ross . Plant physiology. Wadswar Ppublisher Company. Belmont.
2. H.N. Srivastava : Plant Physiology.
3. K.N. Bhatia & M.P. Tyagi : Elementary Biology.
4. V.K. Jain : Fundamentals of Plant Physiology.
5. V.Verma : Text Book of Plant Physiology.



**PUN-201/ BPB-201/ PEP-201 : PUNJABI**

**SYLLABUS & COURSES OF READING FOR PUNJABI  
COMPULSORY (B.Sc. Agriculture/Home Science) /MUDLA  
GYAN/ELEMENTARY PUNJABI WILL BE AS PER UG  
(BOARD OF STUDIES) IN PUNJABI, PUNJABI UNIVERSITY,  
PATIALA**

**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**AGRON-202: Crop Production Technology-II (Rabi crops)**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**Theory**

**SECTION A**

1. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of crops; cereals –wheat and barley.
2. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of crops pulses-chickpea, lentil and peas.
3. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of crops, oilseeds-rape seed, mustard and sunflower.
4. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of crop Safflower and Linseed.

**SECTION B**

1. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Niger Crop.
2. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of crops sugar crops-sugarcane and Sugar beet.

3. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of crops Forage crops-berseem, Lucerne and oat.
4. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of crop - tobacco.

## **PRACTICAL**

**Max. Marks: 40**

**Time allowed: 3 Hours**

### **Practical**

1. Scientific name and family of Rabi crops.
2. To study about the growth stages and morphology of Wheat crop.
3. Identification of weeds in Rabi season.
4. To find out the seed rate of Rabi crops.
5. To calculate the yield and its attributes of Wheat, chickpea, Mustard and Sugarcane.
6. To calculate dose of fertilizer in Rabi crop.
7. Study of crop varieties and important agronomic experiments at experimental farm.
8. Visit to research centers of related crops.
9. Identification of important varieties of rabi crops.

### **Books Recommended**

1. Prasad, R. Field crops Vol.I &II publisher by ICAR
2. Pearson : Handbook of Agriculture ICAR, New Delhi.
3. Fugh B.M : Production of field Crops in India, Kitabistan, Allabhabad
4. Harlison C.M : Field Crops, Mc Graw Hill Book Co., New Delhi.
5. P.A.U Bulletin: Package of practices for Rabi Crops.
6. P.A.U Bulletin: Package of practices for Kharif Crops.
7. Chhidda Singh, Prem Singh &: Modern techniques of raising field Crops.
8. Rajbir Singh Reddy S.R: Agronomy of Field Crops

**. SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**GPB-202: Principles of Seed Technology**

**Theory**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**SECTION A**

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

## **SECTION B**

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

## **PRACTICAL**

**Max. Marks: 40**

**Time allowed: 3 Hours**

### **Practical**

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

### **Recommended books**

1. Agrawal RL. 1997. Seed Technology.
2. Oxford & IBH
3. Desai BB, Katecha PM & Salunkhe DK. 1997. Seed Handbook: Biology, Production, Processing and Storage.
4. Marcel Dekker. Kelly A. 1988. Seed Production of Agricultural Crops.
5. Longman. McDonald MB Jr. & Copeland LO. 1997. Seed Production: Principles and Practices.
6. Chapman & Hall. Thompson JR. 1979. An Introduction to Seed Technology. Leonard Hill.

**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**ENT-202: Pests of Crops & Stored Grains & their Management**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**Theory**

**SECTION A**

1. General account on nature and type of damage by different arthropods pests.
2. Scientific name, order, family, host range, distribution, biology, symptoms of damage and management strategies of important insect pests of rice, maize and wheat.
3. Scientific name, order, family, host range, distribution, biology, symptoms of damage and management strategies of important insect pests of sorghum and pulses: chickpea and pigeon pea.
4. Scientific name, order, family, host range, distribution, biology, symptoms of damage and management strategies of important insect pests of groundnut, mustard, cotton and sugarcane.

**SECTION B**

1. Scientific name, order, family, host range, distribution, biology, symptoms of damage and management strategies of important insect pests of vegetable crop: bhindi, tomato, potato, chillies and cucurbitaceous vegetables: bottle gourd, round gourd and pumpkin.

2. Scientific name, order, family, host range, distribution, biology, symptoms of damage and management strategies of important insect pests of fruit crops: mango, citrus, banana, pomegranate, guava, sapota, ber, apple.
3. Stored grain pests—their biology damage and management. Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain.
4. Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management.

## **PRACTICAL**

**Max. Marks: 40**

**Time allowed: 3 Hours**

### **Practical**

1. Identification of different types of damage.
2. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: Field Crops.
3. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: Vegetable Crops.
4. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: Fruit Crops.
5. Identification of insect pests and Mites associated with stored grain.
6. Determination of insect infestation by different methods.
7. Assessment of losses due to insects.
8. Calculations on the doses of insecticides application technique.
9. Fumigation of grain store / godown.
10. Identification of rodents and rodent control operations in godowns.
11. Identification of birds and bird control operations in godowns.
12. Determination of moisture content of grain.
13. Methods of grain sampling under storage condition.
14. Visit to Indian Storage Management and Research Institute. Visit to nearest FCI godowns.

## BOOKS RECOMMENDED

1. Mani, M.S. : *General Entomology*, Oxford & IBH, New Delhi
2. Ross, H.H. : *A text book of Entomology*, John Willen and Sons
3. Imms. A.D. : *Outlines of Entomology*, Chapman & Hall London
4. Atwal A.S. : *Insect Pests of South East Asia*, Kalyani Publishers, New delhi
5. Narayan, K.K. : *General & Applied Entomology*, Tata McGraw Hill, New Delhi
6. : *Insects Structure and Function*, English
7. Chapman R.F. : *Language Books Society*
8. Pruthi. H.S. : *A Text Book of Entomology*
9. Metcalf, R.H. : *Destructive and Useful Insect*, Mc Graw Hill Book Comp.
10. Mishra, R.C. : *Honey bees and their Management*, ICAR Publication, New Delhi
11. Gatoria G.S and Goyal Tarun : *A Practical manual on Agri-Zoo. And Entomology for B.Sc*  
Agriculture BFC Deon, Bathinda



**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**LPM-201: Livestock Production and Poultry Management**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**Theory**

**SECTION A**

1. Role of livestock and Poultry in the national economy. Livestock and poultry development programmes of Govt. of India and State Govt.
2. Housing principles, space requirements for different species of livestock and poultry.
3. Reproduction in farm animals and poultry. Incubation, hatching and brooding. Management of growers and layers.
4. Management of calves, growing heifers and milch animals. Management of sheep, goat and swine.

**SECTION B**

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

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

## **PRACTICAL**

**Max. Marks: 40**

**Time allowed: 3 Hours**

### **Practical**

1. External body parts of cattle, buffalo, sheep, goat, swine and poultry.
2. Handling and restraining of livestock.
3. Identification methods of farm animals and poultry.
4. Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records.
5. Judging of cattle, buffalo and poultry.
6. Culling of livestock and poultry.
7. Planning and layout of housing for different types of livestock.
8. Computation of rations for livestock. Formulation of concentrate mixtures.
9. Clean milk production, milking methods.
10. Hatchery operations, incubation and hatching equipments.
11. Management of chicks, growers and layers. Debeaking, dusting and vaccination.
12. Economics of cattle, buffalo, sheep, goat, swine and poultry production.

## Books Recommended

1. Singh, H : Hand Book of Animal Husbandary, ICAR, New Delhi.
2. Harbans and Moore : Livestock and Poultry Production, Prentice Hall of India Pvt.Ltd. New Delhi.
3. Juergensens E.M. & Mortenson W.P: Approved practices in Dairying, Oxford I.B.U. Publishing,NewDelhi.
4. Eigan, W.M. Reeges Paul : Dairy Cattle Feed john Wiley & Sons, New York.
5. Morning & Williamson G.K. Payre : Management Animal Husbandary in the Tropic London & Co. London.
6. W.J.A., G.S. Banerjee :An Introduction Text-Book of Animal Husbandary, Oxford I.B.H. New Delhi.
7. Dev, D.S. : Poultry Farming, P.A.U. Bulletine.

**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**AGRIENG-202: Soil and Water Conservation Engineering**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**Theory**

**SECTION A**

1. Surveying-survey equipments, chain survey, Plotting procedure. Calculations of area of regular and irregular fields.
2. Levelling-equipment, terminology, methods of calculation. Types of levelling and contouring.
3. Irrigation-classification of projects, flow irrigation and lift irrigation. Water sources. Water lifting devices-pumps, their capacity and power calculations.
4. Irrigation water measurement-weirs, flumes and orifices.

**SECTION B**

1. Introduction to soil and water conservation, causes of soil erosion. Definition and agents of soil erosion, water erosion, forms of water erosion.
2. Gully classification and control measures. Soil loss estimation by universal soil loss equation. Soil loss measurement techniques. Principles of erosion control.
3. Introduction to contouring, strip cropping, contour bund, graded bund and bench terracing, grassed water ways and their design.

- Water harvesting and its techniques. Wind erosion: mechanics of wind erosion, types of soil movement. Principles of wind erosion control and its control measures.

## PRACTICAL

**Max. Marks: 40**

**Time allowed: 3 Hours**

### Practical

- Acquaintance with chain survey equipment. Ranging and measurement of offsets. Chain triangulation and plotting.
- Levelling equipment. Differential leveling, profile levelling. Contour survey and plotting
- 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.
- Preparation of contour maps.
- Design of grassed water ways. And contour bunds.
- Design of graded bunds and bench terracing system.
- Problem on wind erosion.

### BOOKS RECOMMENDED

Baver, L.D.	:	<i>Soil Physics</i> (Ch. 8, 9 & 12 only), John Willey & Sons, New Delhi
Iraelson	:	<i>Irrigation Principles</i> , John Willey & Sons, New Delhi
Rama Rao	:	<i>Soil Conservation</i> ICAR, New Delhi, A Manual on Conservation of Soil and Water, USDA, Oxford Book Comp., New Delhi.
Gandhi R.T., Gupta P.C., Joseph A.P. and Rage N.I.		<i>Handbook of Irrigation – Water Management</i>
Dastane N.G., Singh M., Hukeri S.B.	:	<i>Review of Work done on Water Requirement of Crops in India</i>
Mickael A.M. and Ojha T.P. :		<i>Principles of Agricultural Engg.</i> , Volume II
Mickael, A.M.	:	<i>Irrigation: Theory and Practices</i>
Paliwal, K.V.	:	<i>Irrigation with Saline Water</i> , IARI, New Delhi.
Reddie, T.Y. and Reddy G.H.S.:		Efficient use of irrigation water

**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**HORT-202: Production Technology for Vegetable Crops**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**SECTION A**

1. Importance of vegetables & spices in human nutrition and national economy.
2. Brief account about origin, area, production, improved varieties and cultivation practices of- tomato, brinjal, chillies and okra.
3. Brief about origin, area, production, improved varieties and cultivation practices of Cucurbitaceous vegetables- cucumber, ridge gourd, bottle gourd, bitter gourd and melons.
4. Brief about origin, area, production, improved varieties and cultivation practices of Cole crops – cabbage, cauliflower and knol–khol.

**SECTION B**

1. Brief about origin, area, production, improved varieties and cultivation practices of Bulb crops – onion and garlic. Beans and peas, French beans, cluster beans, peas and cowpea.
2. Brief about origin, area, production, improved varieties and cultivation practices of Tuber- crops : potato, sweet potato,
3. Brief about origin, area, production, improved varieties and cultivation practices of Root crops – carrot, radish, turnip and beet root.

4. Brief about origin, area, production, improved varieties and cultivation practices of leafy vegetables – amaranthus, palak, and methi.

## **PRACTICAL**

**Max. Marks: 40**

**Time allowed: 3 Hours**

### **Practical**

1. Identification of vegetables crops and their seeds.
2. Nursery raising of vegetables, direct seed sowing and transplanting.
3. Study of morphological characters of different vegetables.
4. Methods of Fertilizers applications.
5. Seed extraction of tomato and brinjal.
6. Harvesting & preparation for market.
7. Economics of vegetables cultivation.
8. Visit to commercial vegetable farms.

### **Books Recommended**

- |                             |   |
|-----------------------------|---|
| 1. M.S. Dhaliwal            | : Hand Book of Vegetable crops.                       |
| 2. G.S. Sani                | : Text Book of vegetable production.                  |
| 3. PAU Lud                  | : Package of practices for cultivation of vegetables. |
| 4. Yawlkar                  | : Vegetable crops.                                    |
| 5. Vishnu Swarup            | : Vegetable science and technology in India.          |
| 6. Prem Nath, S. Velayudhan | : Vegetables for Tropical Regions.                    |
| 7. D.P. Singh M.K. Rana     | : Scientific Cultivation of Vegetables.               |
| 8. Chadha, K.L.             | : Handbook of Horticulture (ICAR)                     |

**SYLLABUS  
OUTLINES OF TEST,  
SYLLABI AND COURSE OF READING FOR  
B.Sc.(Hons. in Agriculture) PART — II**

**PATH-202: Disease of Field Crops & their Management**

**Max Marks: 100**

**Theory: 45**

**Internal Assessment: 15**

**Duration of the Paper: 3 Hour**

**Practical: 40**

**Pass Marks: 40%**

**INSTRUCTIONS FOR PAPER SETTER**

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and will carry 9 marks each. Section C will consist of 9 short-answer type questions of 1 mark each which will cover the entire syllabus uniformly and will carry 9 marks in all.

**INSTRUCTIONS FOR CANDIDATES**

The Candidates are required to attempt two questions from each section A and B and the entire section C.

**SECTION A**

1. Symptoms, etiology, disease cycle and management of major diseases of Rice: blast, brown spot, bacterial blight and khaira.
2. Symptoms, etiology, disease cycle and management of major disease of Maize: stalk rots and downy mildew. Sorghum: smuts and anthracnose. Bajra: downy mildew and ergot. Groundnut: early and late leaf spots.
3. Symptoms, etiology, disease cycle and management of major disease of Soybean: Rhizoctonia blight, bacterial spot and mosaic. Pigeonpea: Phytophthora blight, wilt and sterility mosaic
4. Symptoms, etiology, disease cycle and management of major disease of Finger millet: Blast and leaf spot. Tobacco: black shank, black root rot and mosaic.

**SECTION B**

1. Symptoms, etiology, disease cycle and management of following diseases of wheat crops: rusts, loose smut, karnal bunt and ear cockle.



2. Symptoms, etiology, disease cycle and management of following diseases of Sugarcane: red rot, smut, and ratoon stunting.
3. Symptoms, etiology, disease cycle and management of following diseases of Mustard: Alternaria blight, white rust, downy mildew.
4. Symptoms, etiology, disease cycle and management of following diseases of Potato: early and late blight, black scurf, leaf roll, and mosaic

### **PRACTICAL**

**Max. Marks: 40**

**Time allowed: 3 Hours**

#### **Practical**

1. Identification and histopathological studies of selected diseases of field crops covered in theory
2. Field visit for the diagnosis of field problems.
3. Collection and preservation of plant diseased specimens for herbarium.

#### **BOOKS RECOMMENDED**

- |  |                            |
|--|----------------------------|
| 1. Alexopolues                             | : Introductory Mycology    |
| 2. Mundkur, C.T. B.B. & Chattopadhyaya, SB | : Fungi and Plant Diseases |
| 3. Singh, RS                               | : Plant Diseases           |
| 4. R.P. Singh                              | : Plant Pathology          |
| 5. G.L. Chopra                             | : Fungi                    |
| 6. B.P. Pandey                             | : Plant Pathology          |

**PUN-202/ BPB-202/ PEP-202 : PUNJABI**

**SYLLABUS & COURSES OF READING FOR PUNJABI  
COMPULSORY (B.Sc. Agriculture/Home Science)/MUDLA  
GYAN/ELEMENTARY PUNJABI WILL BE AS PER UG (BOARD OF  
STUDIES) IN PUNJABI, PUNJABI UNIVERSITY, PATIALA.**

**All UG Courses - II Year (Annual & 4th Semester)**

**Environmental and Road Safety Awareness**

**COMMON FOR ALL UNDERGRADUATE DEGREE COURSES  
PART-II(SEMESTER-IV)QUALIFYING SUBJECT- ENVIRONMENTAL &  
ROAD SAFETY AWARENESS**