

PUNJABI UNIVERSITY, PATIALA

**Scheme of Studies and Examinations for the
B.Sc. (Hon's in Agriculture) PART-III (Semester-V)
Session: 2018-19, 2019-20 and 2020-21**

PAPER NO.	SUBJECT	THEORY		PRACTICAL	TOTAL
		EXTERNAL	INTERNAL		
STAT-301	STATISTICAL METHODS	45	15	40	100
PATH-301	DISEASES OF HORTICULTURAL CROPS AND THEIR MANAGEMENT	45	15	40	100
HORT-301	PRODUCTION TECHNOLOGY FOR ORNAMENTALCROPS AND LANDSCAPING	45	15	40	100
FSM-301	PRINCIPLES OF FOOD SCIENCE AND POST-HARVEST MANAGEMENT	45	15	40	100
EXT-301	FUNDAMENTAL OF AGRICULTURE EXTENSION	45	15	40	100
GPB-301	CROP IMPROVEMENT	45	15	40	100
BIOT-301	INTRODUCTION TO BIOTECHNOLOGY	45	15	40	100
VIII (A)	PUNJABI COMPULSARY (FOR PUNJAB STATE STUDENTS)/PUNJABI MUDHLA GYAN (FOR OTHER STATE STUDENTS)	75	25	-	100
Total					800

B.Sc. (Hon's in Agriculture) PART-III (Semester-VI)

PAPER NO.	SUBJECT	THEORY		PRACTICAL	TOTAL
		EXTERNAL	INTERNAL		
PATH-302	INTEGRATED PEST AND DISEASE MANAGEMENT	45	15	40	100
HORT-302	POST-HARVEST MANAGEMENT OF HORTICULTURAL CROP AND VALUE ADDITION	45	15	40	100
FOOD-301	DAIRY TECHNOLOGY	45	15	40	100
AGRON-301	PRINCIPLES OF ORGANIC FARMING	45	15	40	100
COMP-301	COMPUTER APPLICATION IN AGRICULTURE	45	15	40	100
SOIL-301	ANALYTICAL TECHNIQUES IN SOIL, PLANT, FERTILIZER AND WATER	45	15	40	100
HORT-303	PRODUCTION TECHNOLOGY OF SPICES, PLANTATION, MEDICINALAND AROMATIC PLANTS	45	15	40	100
VIII (B)	PUNJABI COMPULSARY (FOR PUNJAB STATE STUDENTS)/PUNJABI MUDHLA GYAN (FOR OTHER STATE STUDENTS)	75	25	-	100
Total					800

SYLLABUS

B.Sc. (Hon's in Agriculture)
Session 2018-2019, 2019-2020 & 2020-21
PART - III (Semester-V)

STAT-301 STATISTICAL METHODS

Max Marks: 100

Theory: 45

Internal Assessment: 15

Duration of the Paper: 3 Hour

Practical: 40

Pass Marks : 40% in Theory & Practical Separately

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. Introduction to Statistics and its Applications in Agriculture, graphically representation, Measure of central tendency and measure of dispersion
2. Definition of probability, Addition and multiplication theorem (without proof).
3. Define binomial distribution, normal distribution and Poisson distribution.
4. Definition of correlation, scatter diagram, Karl's Pearson's correlation coefficient and rank correlation coefficient.

SECTION B

5. Define regression coefficient, principal of least square method.
6. Introduction to test of significance, one sample and two sample test-t for mean.
7. Definition of chi- square test and goodness of fit test, define analysis of variance.
8. Introduction to sampling methods, sampling versus complete enumeration, simple random sampling with replacement and without replacement.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Graphical representation data
2. Calculate mean, median and mode
3. Calculate of correlation coefficient with Karl's pearson and rank correlation.
4. Calculate regression with least square methods.
5. Calculate quartile, deciles and percentiles.
6. Chi-square with goodness of fit.
7. Calculate binomial, normal distribution.
8. Calculate ANOVA with one way classification.

BOOKS RECOMMENDED

Panse and Sukhtame	:	<i>Statistical Methods for Agricultural Works</i>
C.B. Gupta	:	<i>Statistical Method</i>
Croxton & Cowden	:	<i>Applied General Statistics</i>
Chandel	:	<i>A Hand book of Agricultural Statistics</i>
Kailasam, C, Gangai Selvi, R	:	<i>Applied Statistics</i>

PATH-301 DISEASES OF HORTICULTURAL CROPS AND THEIR MANAGEMENT

Max Marks: 100

Duration of the Paper: 3 Hour

Theory: 45

Practical: 40

Internal Assessment: 15

Pass Marks : 40% in Theory & Practical Separately

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. Introduction, definition of disease and terminology use in plant disease i.e. pathogen, parasite, biotroph, saprophyte, pathogenesis, virulence, immunity, hypersensitivity, infection, endemic and epidemic disease.
2. Economic importance symptoms, causal organism, disease cycle and control measure of fruit crops that are Citrus, Mango, Banana, Papaya, Guava, Grapes, Litchi, Ber, Strawberry, Apple, Pear, Peach and Plum.

SECTION B

3. Symptoms, causal organism, disease cycle, management of disease of vegetable crops: Tomato, Brinjal, Chilli, Muskmelon, Watermelon, Cucumber, Okra, Radish, Pea, Cauliflower, Onion, Spinach and Potato.
4. Economic importance symptoms, causal organism, disease cycle and control measure of flower crops that i.e. Rose, gladiolas, Carnation, Gerbera and marigold.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Study of symptoms of host parasite relationship of Okra.
2. Study of the symptoms and control measure of late blight of Potato.
3. Study of dieback disease of Rose.
4. Identification of different disease in the field condition.
5. Study the leaf curl and mosaic disease of Papaya.
6. Study the symptom of fungal disease of pear crop.

BOOKS RECOMMENDED

Alexopolues,	:	<i>Introductory Mycology</i>
Mundkur, C.T. B.B. & Chattopadhyaya, SB	:	<i>Fungi and Plant Diseases</i>
Singh, RS	:	<i>Plant Diseases</i>
R.P. Singh	:	<i>Plant Pathology</i>
G.L. Chopra	:	<i>Fungi</i>
B.P. Pandey	:	<i>Plant Pathology</i>

Hort-301 PRODUCTION TECHNOLOGY FOR ORNAMENTAL CROPS AND LANDSCAPING

Max Marks: 100

Theory: 45

Internal Assessment: 15

Duration of the Paper: 3 Hour

Practical: 40

Pass Marks : 40% in Theory & Practical Separately

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, status and scope of ornamental crops in India and its potential trade in globe.
2. History of gardening, characteristics of formal and informal types of gardens i.e. Mughal, japons and English garden.Lawn and its management.
3. Definition of landscaping and principles of art and landscaping, Landscape uses of trees, shrubs, climbers, pot plants, cactus and shade loving plants.
4. Preparation of landscaping plan for homes, farm complex, small parks and institutions.

SECTION B

5. Production technology of important cut flowers like rose, gerbera, carnation, liliium and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions.
6. Package of practices for loose flowers like marigold, chrysanthemum and jasmine under open conditions.
7. Production technology of annuals flower, cactus and succulents.Management and care of trees, shrubs and climbers. Flower seed production.
8. Post-harvest management, processing and value addition in ornamental crops produce.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Study the propagation of ornamental crop.
2. Study the important flowering trees/shrubs/climbers/annuals/palms.
3. Study the important ornamental ground cover crops
4. Study about the pot culture and management.
5. Study the lawn and their management

BOOKS RECOMMENDED

J.S. Arora : Introductory ornamental horticulture.

Desh Raj : Floriculture at a glance.

T. K. Bose : Commercial Floriculture

B.P.Pal : The rose of India (ICAR)

K.L. Chadha and B. choudhary: Ornamental horticulture in India (ICAR)

FSM-301 PRINCIPLES OF FOOD SCIENCE AND POST-HARVEST MANAGEMENT

Max Marks: 100

Theory: 45

Internal Assessment: 15

Duration of the Paper: 3 Hour

Practical: 40

Pass Marks : 40% in Theory & Practical Separately

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. Concepts of Food Science (definitions, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems etc.
2. Food groups and concept of balanced diet. Causes of food spoilage.
3. Food composition and chemistry (water, carbohydrates, proteins, fats, vitamins, minerals, flavours, colours, miscellaneous bioactives, important reactions).
4. Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production of fermented foods).

SECTION B

5. Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.).
6. Food and nutrition, Malnutrition (over and under nutrition), nutritional disorders; Energy metabolism (carbohydrate, fat, proteins); Balanced/ modified diets, Menu planning, New trends in food science and nutrition.
7. Post-harvest handling and technology of fruits, vegetable, cereals, pulses, oilseeds, milk, egg, meat and poultry.
8. Food safety, adulteration and food laws. Status of food industry in India.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Study the quality assessment of Rice.
2. Manufacture of Barley malt.
3. Study the preparation of fruit jam.
4. Study the preparation of fruit jelly.
5. Manufacture of Tomato ketchup/Tomato sauce.
6. Study the processing and preservation of meat.
7. Study the different value added product made from vegetable, milk, egg and meat.
8. Visits to local processing units.

BOOKS RECOMMENDED

1. Singh, J : Hand book of Agriculture, publish by ICAR.
2. S, Mohini and E. S. Rav : Food Science Experiments and application
3. Brooker, B.E. : Food theory and application
4. Russell, N.J and Gould,G.W :Food Preservations
5. Ranganna, S. : Handbook of analysis and quality control for fruits and Vegetable products. Ed.2. New delhi: Tata Mcgraw Hill publishing Co.Ltd.
6. Lal, Girdhari. :Fruit and vegetable preservation, ICAR
7. Pandey, P.H. principles &practices of Post-harvest technology, Kalyani Publishers

EXT-301 FUNDAMENTAL OF AGRICULTURE EXTENSION

Max Marks: 100

Duration of the Paper: 3 Hour

Theory: 45

Practical: 40

Internal Assessment: 15

Pass Marks : 40% in Theory & Practical Separately

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. Extension Education- meaning, definition, scope, process and objectives. History of extension education, extension educational activities in India.
2. Elements in extension, teaching process, characteristics of effective extension teaching-learning.
3. Principles of Extension Education; Extension Programme planning- Meaning, Process, Principles and Steps in Programme Development.
4. Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.), post-independence era (Etawah Pilot Project, Nilokheri Experiment, etc.)

SECTION B

5. Various extension/ agriculture development programmes launched by ICAR/ Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND, NATP, NAIP, ATARI etc.).
6. New trends in agriculture extension: privatization extension, cyber extension/ e-extension, market-led extension, farmer-led extension, expert systems, etc.
7. Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Development.-meaning, definition, concept & principles, Physiology of C.D.
8. Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. To get acquainted with university extension system.
2. Visit to the offices of local development agencies covering agricultural and dairy development activities in the area for analysis of their pattern of working.
3. Preparation of some visual aids and their use at various stages of Adaptation Process.
4. Preparing agriculture and dairy development programmes at the block I and district level. Simple procedures and techniques for evaluating the extension programme.
5. Visit to NGO and learning from their experience in rural development.
6. script writing, writing for print and electronic media, developing script for radio and television.

BOOKS RECOMMENDED

- | | | |
|-------------------------------|---|--|
| Dahama, O.P. | : | <i>Extension of Rural Welfare</i> , 1973, Ram Prasad and Sons, Agra. |
| Grewal, J.S. and Tamber, R.S. | : | <i>Introduction to Extension Education</i> , 1970, Punjab Agricultural University, Ludhiana. |
| Rudramoorthy, B. | : | <i>Extension in Planned Social Change</i> , 1964, Applied Publication, Bombay. |
| Sandhu, A.S. | : | <i>Extension Programme, Planning</i> , 1971, P.A.U., Ludhiana |

GPB-301 CROP IMPROVEMENT

Max Marks: 100

Duration of the Paper: 3 Hour

Theory: 45

Practical: 40

Internal Assessment: 15

Pass Marks : 40% in Theory & Practical Separately

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. Centers of origin, distribution of species, wild relatives, Floral biology in cereals and pulses-Wheat, Rice, pigeon pea and chick pea.
2. Plant genetic resources, its utilization and conservation, study of genetics of qualitative and quantitative characters.
3. Important concepts of breeding self-pollinated cross-pollinated and vegetatively propagated crops.

SECTION B

5. Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids varieties.
6. Adaptability, stability, abiotic and biotic stress tolerance. Seed production technology in self-pollinated, cross-pollinated and vegetative propagated crops.
7. Hybrid seed production technology in cereals and pulses.
8. Ideotype concept and climate resilient crop varieties for future.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Emasculation and hybridization techniques in different field crop species; viz., Wheat, Paddy, Gram Maize, Cotton, Cowpea, Pearl millet and Tobacco.
2. Maintenance breeding of different kharif crops.
3. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods
4. Study of field techniques for seed production and hybrid seeds production in *Kharif* crops
5. Estimation of heterosis, inbreeding depression and heritability
6. Layout of field experiments; Study of quality characters, donor parents for different characters;
7. Visit to seed production plots
8. Visit to ICAR/SAU of different field crops.

BOOK READING

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

BIOT-301 INTRODUCTION TO BIOTECHNOLOGY

Max Marks: 100

Duration of the Paper: 3 Hour

Theory: 45

Practical: 40

Internal Assessment: 15

Pass Marks : 40% in Theory & Practical Separately

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, definitions, concepts, scope and importance of agriculture biotechnology.
2. Define the plant, microbial, animal, medical, environmental, industrial, Marine, Agricultural and food Biotechnology; Nano biotechnology.
3. Introduction to recombinant DNA technology and its applications in agriculture.
4. Vectors, DNA restriction and modifying enzymes, gene cloning and gene mapping.

SECTION B

5. Introduction to genomics and proteomics, molecular markers and its uses in agriculture.
6. DNA sequencing; Genetic transformation and transgenic organisms; Bioinformatics.
7. Bio safety guidelines Marker Assisted Selection (MAS) and mapping population it's used in agriculture.
8. Concept and history, various aspects of plant tissue culture and it's used in agriculture.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Orientation to the laboratories: glass houses, screen houses, transgenic facilities and field area
2. Tissue culture techniques
3. General guidelines for working in Biotechnology laboratories
4. Familiarization with basic equipment's used in biotechnology
5. Selection of chemicals (different grade), buffer preparation
6. Collations and scientific notations used in laboratories.

SUGGESTED READINGS

Brown T A. 2002. *Genomes 2*. 2nd ed. New york:Wiley-Liss.

Prave P, Faust U, Sittig W & Sukatsch DA. 1987. *Basic Biotechnology: A Student's Guide*. VCH Verlagsgesellschaft.

Renneberg R. 2008. *Biotechnology for Beginners*. Academic Press Publishers.

Singh, B. D. Plant Biotechnology

Chawla H.S. Introduction to Plant Biotechnology, Oxford & IBH, New Delhi.

PAPER-VIII(A) : Punjabi compulsory/Mudla Gyan/Elementary Punjabi

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**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**

B.Sc. (Hon's in Agriculture) PART — III
Session 2018-2019, 2019-2020 & 2020-21
(Semester-VI)

PATH-302 INTEGRATED PEST AND DISEASE MANAGEMENT

Max Marks: 100

Duration of the Paper: 3 Hour

Theory: 45

Practical: 40

Internal Assessment: 15

Pass Marks : 40% in Theory & Practical Separately

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. Categories of insect pests and diseases, IPM: Introduction, history, importance, concepts, principles and tools of IPM.
2. Economic importance of insect pests, diseases and pest risk analysis. Methods of detection and diagnosis of insect pest and diseases.
3. Calculation and dynamics of economic injury level and importance of Economic threshold level.
4. Methods of control-host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control.

SECTION B

5. Ecological management of crop environment. Introduction to conventional pesticides for the insect pests and disease management.
6. Survey surveillance and forecasting of Insect, pest and diseases.
7. Development and validation of IPM module. Implementation and impact of IPM (IPM module for Insect pest and disease).
8. Safety issues in pesticide uses. Political, social and legal implication of IPM. Case histories of important IPM programmes.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Methods of diagnosis and detection of various insect pests.
2. Methods of diagnosis and detection of various plant diseases.
3. Methods of insect pests and plant disease management.
4. Assessment of crop yield losses, calculations based on economics of IPM.
5. Study the control measure of the crops by the different biological agents.
6. Study the different mechanical and physical methods to control the insect pest of the field crop.
7. Awareness campaign at farmer's fields.
8. Forecasting for crops

BOOKS RECOMMENDED

Mani, M.S. : *General Entomology*, Oxford & IBH, New Delhi

Ross, H.H. : *A text book of Entomology*, John Willen and Sons

Imms. A.D. : *Outlines of Entomology*, Chapman & Hall London

Atwal A.S. : *Insect Pests of South East Asia*, Kalyani Publishers,
New delhi

Narayan, K.K. : *General & Applied Entomology*, Tata McGraw Hill,
New Delhi

: *Insects Structure and Function*, English

Chapman R.F. : *Language Books Society*

Pruthi. H.S. : *A Text Book of Entomology*

Metcalf, R.H. : *Destructive and Useful Insect*, 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

G.S. Dhariwal and Arora, Ramesh : *Intergrated post management concept and approaches.*

HORT-302 POST-HARVEST MANAGEMENT OF HORTICULTURAL CROP AND VALUE ADDITION.

Max Marks: 100

Theory: 45

Internal Assessment: 15

Duration of the Paper: 3 Hour

Practical: 40

Pass Marks : 40% in Theory & Practical Separately

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 agriculture crops, extent and possible causes of post-harvest losses.
2. Pre-harvest factors affecting postharvest quality, maturity, harvesting, ripening and Biochemistry of ripening; Respiration and factors affecting respiration rate, Role of ethylene.
3. Post harvest disease and disorders; Heat, chilling and freezing injury; Harvesting and field handling; Packaging and storage (ZECC, cold storage, CA, MA, HACCP and hypobaric)
4. Value addition concept; Principles and methods of preservation of fruit and vegetable crops.

SECTION B

5. Preparation of Jam, jelly, marmalade, preserve, candy, pickles, chutney – Concepts and Standards viz. FASSI/FPO.
6. Fermented and non-fermented beverages. Tomato products- Concepts and Standards
7. Post-harvest management of fruits, vegetables, flowers, medicinal and aromatics plants, traditional food and grasses and fodder crops.
8. Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. Canning -- Concepts and Standards, packaging of products.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Applications of different types of packaging material for enhancing shelf life.
2. Effect of temperature on shelf life and quality of produce.
3. Demonstration of chilling and freezing injury in vegetables and fruits.
4. Extraction and preservation of pulps and juices.
5. Preparation of jam, jelly and tomato products, canned products.
6. Physiological disorders in fruits, vegetables and fruits
7. Visit to processing unit/ industry, local market and mandies.

BOOK READING

Kalia, manoranjan and Sood Sangeeta : Food preservation and processing

Pnadey, P.H. : principles and practices of post harvest technology

Pandey, P.H, Sadhana, Pandey and P.H. pandey :Post harvest management and Horticulture crops.

FOOD-301 DAIRY TECHNOLOGY

Max Marks: 100

Duration of the Paper: 3 Hour

Theory: 45

Practical: 40

Internal Assessment: 15

Pass Marks : 40% in Theory & Practical Separately

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. Definition, composition and factors affecting the quality and yield, physical, chemical and nutritive properties of milk, colostrums, its composition and utility.
2. Liquid milk processing - clarification, pasteurization, homogenization, chilling and packaging. Fluid milk - toned, double toned, standardized, recombined and reconstituted.
3. Fermented milks - natural, cultured buttermilk, acidophilus, bulgaricus, kafil and koumiss. Nutrient value of fermented milk powder
4. Preparation of milk products - cheese condensed and evaporated milks. Whole and skim milk powder and ice cream.

SECTION B

5. Ghee: Preparation of Ghee from Cream and from butter by village method, Pre-stratification method, Agmark Ghee.
6. Cheese: Quality of milk for cheese, Different types of cheese Soft cheese, Cottage cheese. Hard type cheddar cheese. Indian cheese – Surti cheese and Panir. Methods of preparation.
7. Legal and BIS standards of milk and milk products. Plant sanitation and effluent disposal.
8. Utilization of by-products. Dairy plant layout and project formulation.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Sampling equipment & sampling of milk and milk products.
2. Testing of milk and cream for fat by carber method.
3. Determination of specific gravity by Lactometer.
4. Determination of acidity of milk and cream to assess its suitability to heat treatments.
5. Detection of adulteration of milk.
6. Detection of preservatives and starch in milk.
7. Fitting and adjusting and separation of milk by the cream separator.
8. Preparation of starter cultures.
9. Preparation of Khoa.
10. Ice Cream making.
11. Visit to Verka Milk Plant.

BOOKS RECOMMENDED

Peterson	:	<i>Dairy Science</i> , Inc. London
Eckless J. Henry	:	<i>Milk & Milk Products</i> , Mc. Graw Hill Book Co. Inc., London and Macy Harold
Combs Willies Barner	:	<i>Principal of Dairy Processing</i> , Willey Eastern Ltd., New Delhi
Warner Jmaes N.	:	<i>A Text Book of Dairy Chemistry</i> , Chapman and Hall Ltd., London
Edger, R. Ling	:	<i>The Principles of Dairy</i> , John Willy and Sons, New York.
Judhins H.F. and Mech M.J.	:	<i>Indian Dairy Product</i> <i>Outlines of Dairy Technology</i>
Rangappa, K.S. and Achaya K.T. Sukhmar De	:	<i>Technical Bulletins</i> , NDRI, Karnal
Warner James N.	:	<i>Market Milk & Milk Products</i>
Sommer	:	<i>Milk Pasteurization Planing Plant Operation and Control</i>
Key & Others	:	

AGRON-301 PRINCIPLES OF ORGANIC FARMING

Max Marks: 100

Duration of the Paper: 3 Hour

Theory: 45

Practical: 40

Internal Assessment: 15

Pass Marks : 40% in Theory & Practical Separately

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. Organic farming, principles and its scope in India
2. Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture (NOFRI, APEDA, PAGRO and Sikkim model).
3. Organic ecosystem and their concepts; Organic nutrient resources and its fortification.
4. Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming, Biodynamic.

SECTION B

5. Fundamentals of insect, pest, disease and weed management under organic mode of production
6. Operational structure of NPOP; Certification process and standards of organic farming
7. Processing, leveling, economic considerations and viability, marketing and export potential of organic products.
8. Future scope of organic farming and outcome of organic farming in India.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Visit of organic farms to study the various components and their utilization.
2. Preparation of enrich compost.
3. Preparation of enrich vermicompost.
4. Bio-fertilizers/bio-inoculants and their quality analysis.
5. Indigenous technology knowledge (ITK) for nutrient, insect, pest disease
6. Study the weed management in organic farming.
7. Post-harvest management of quality aspect grading, packing and handling.

BOOK READING

- Panda S. C. Organic farming for sustainable agriculture.
- Ananthakrishnan TN. (Ed.). 1992. *Emerging Trends in Biological Control of Phytophagous Insects*. Oxford & IBH.
- Gaur AC. 1982. *A Manual of Rural Composting*, FAO/UNDP Regional Project Document, FAO.
- Lampin N. 1990. *Organic Farming*. Press Books, Lpswitch, UK.
- Palaniappan SP & Anandurai K. 1999. *Organic Farming – Theory and Practice*. Scientific Publ.
- Rao BV Venkata. 1995. *Small Farmer Focused Integrated Rural Development: Socio-economic Environment and Legal Perspective*: Publ.3, Parisaraprajna Parishtana, Bangalore.
- Reddy MV. (Ed.). 1995. *Soil Organisms and Litter Decomposition in the Tropics*. Oxford & IBH.
- Sharma A. 2002. *Hand Book of Organic Farming*. Agrobios.
- Singh SP. (Ed.) 1994. *Technology for Production of Natural Enemies*. PDBC, Bangalore.
- Subba Rao NS. 2002. *Soil Microbiology*. Oxford & IBH.
- Trivedi RN.1993. *A Text Book of Environmental Sciences*, Anmol Publ.
- Veeresh GK, Shivashankar K & Suiglachar MA. 1997. *Organic Farming and Sustainable Agriculture*. Association for Promotion of Organic Farming, Bangalore.
- WHO. 1990. *Public Health Impact of Pesticides Used in Agriculture*.WHO.
- Woolmer PL & Swift MJ. 1994. *The Biological Management of Tropical Soil Fertility*. TSBF & Wiley.

COMP-301 COMPUTER APPLICATION IN AGRICULTURE

Max Marks: 100

Theory: 45

Internal Assessment: 15

Duration of the Paper: 3 Hour

Practical: 40

Pass Marks : 40% in Theory & Practical Separately

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. Introduction to computer, anatomy of computers, memory concepts, units of memory, operating system, definition and types
2. Applications of MS-Office for creating, editing and formatting a document, data presentation, tabulation and graph creation, database, concepts and types, creating database, uses of DBMS in agriculture, internet and World wide web (WWW), concepts and components.
3. Computer programming, general concepts, introduction to visual basic, java, Fortran, C/C++, etc, concepts and standard input/output operations.
4. Introduction to computers and personal computers, basic concepts, operating system, DOS and windows,

SECTION B

5. MS Word- Features of word processing, creating documents and tables and printing of document
6. MS EXCEL-concepts of electronic spreadsheet, creating, editing and saving of spreadsheet, inbuilt statistical functions and formula bar
7. MS Power point preparation, presentation of slides and slide show. Introduction to programming preparation, basic language, concepts basic and programming techniques,
8. MS office, Excel, PowerPoint, introduction to multimedia and its applications Visual basic concepts, basic and programming techniques, introduction to internet.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Study of computer component accessories, practice of important DOS commands.
2. Introduction of different operating systems such as windows, Unix/Linux, creating, files & folders file management.
3. Use of MS-WORD and MS power point for creating, editing and presenting a scientific document.
4. MS-EXCEL- Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data, handling macros.
5. MS-ACCESS: Creating database, preparing queries and reports, Introduction to World Wide Web (WWW) and its components.
6. Introduction of programming language such as Visual Basic, Java. Fortran, C,C++.

BOOKS RECOMMENDED

- Gene Wrisskpof (1998) 'Abc's Of Excel'
- Sharma K.V.S. (2001) 'Simple: Cu It Yourself On Pc. Prentice
- Capron.H.L. (1996) 'Computer. —Tools For An Information Age - Fourth Edition. Berijimiin /Cummings, New York.
- Colin Haynes. (1990) 'The. Computer Virus Protection Handbook. Bpb
- Peter Nortons. (2001) 'Introduction To Computer; — Fourth Edition. Tata Iv: Publishing Co. Ltd.,New Delhi.

SOIL-301 ANALYTICAL TECHNIQUES IN SOIL, PLANT, FERTILIZER AND WATER

Max Marks: 100

Theory: 45

Internal Assessment: 15

Duration of the Paper: 3 Hour

Practical: 40

Pass Marks : 40% in Theory & Practical Separately

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. Soil fertility evaluation, colorimetric and flame photometric method. Soil, water and plant sampling techniques, their processing and handling.
2. Analysis of soil and plant samples for N, P, K, Ca, Mg, S, Zn and Cu
3. Methods of soil analysis- particle size distribution, bulk and particle density, moisture constants.
4. Modern methods of soil, plant and fertilizer analysis, Atomic absorption Spectrophotometer.

SECTION B

5. Methods of soil analysis- particle size distribution, bulk and particle density, relationship between bulk density and particle density.
6. Determination of cation and anion exchange capacities of soils and their importance Ion adsorption, desorption and fixation in soil
7. Fertilizer control order. Acid, saline, sodic, calcareous soil and their classification.
8. Planning and formulation of project on establishment of soil, water and plant testing laboratory.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Preparation of standard solution.
2. Collection of soil, plant, water and fertilizer samples.
3. Plant analysis for total N,P,K.
4. Determination of micronutrient in plant Sample by Atomic absorption spectrophotometer.
5. Analysis for irrigation water.
6. Collection of soil/leaf sampling of different area in Punjab and Rajasthan
7. Fertilizer analysis for quality control.

HORT-303 PRODUCTION TECHNOLOGY OF SPICES, PLANTATION, MEDICINAL AND AROMATIC PLANTS

Max Marks: 100

Theory: 45

Internal Assessment: 15

Duration of the Paper: 3 Hour

Practical: 40

Pass Marks : 40% in Theory & Practical Separately

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, classification, taxonomy, species and scope of spices, plantation, medicinal and aromatic plants in human nutrition in national economy.
2. The origin, classification, taxonomy, species, area and package and practices of spices: Cardamom, Cumin, Coriander, Nutmeg, Mace, Pepper, Clove and Saffron.
3. The origin, classification, taxonomy, species, area and package and practices of plantation crops: Tea, coffee, Coconut, Rubber, Cocoa and Cashewnut.

SECTION B

4. The origin, classification, taxonomy, species, area and package and practices of medicinal plants: Glycyrrhiza, Stevia, Aloe, Opium, Ocimum, Rauwolfia and Isabgol.
5. The origin, classification, taxonomy, species, area and package and practices of Aromatic plants: Rose, Jasmine, Citrus, Tuberose, Mentha, Lemongrass, Citronella and Geranium.

PRACTICAL

Max. Marks : 40

Duration of the Paper: 3 Hours

1. Identification of Medicinal Plants.
2. Identification of Aromatic Plants.
3. Nursery bed preparation and seed sowing.
4. Study the training and pruning of plantation plants.
5. Bed preparation and planting of MAP.
6. Intercultural operations in flowers and MAP.
7. Study of morphological character of tea and aniseed.
8. Processing of MAP.
9. Visit to commercial flower/MAP unit.

BOOK READING

Hand book of horticulture: Publisher by ICAR
J.S Pruthy : Spices and Condiments
H.C. Srivastava : Medicinal and Aromatic plants.

PAPER-VIII(B) : Punjabi Compulsory/Mudla Gyan/Elementary Punjabi

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**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**