

Punjabi University, Patiala  
Scheme of Studies and Syllabus for  
B.Sc. Agriculture (Horticulture) Part IV (Sem.VII & VIII)  
Session 2019-2020, 2020-2021 & 2021-22

**Scheme  
for  
B.Sc. AGRICULTURE (HORTICULTURE)  
Session: 2019-20, 2020-21 & 2021-22  
PART - IV (Semester-VII)**

Subject Code	Subjects	Theory		Practical	Total
		External	Internal		
I	Commercial Floriculture	45	15	40	100
II	Breeding of Vegetable Crops	45	15	40	100
III	Post Harvest Management of Horticultural Crops and Value Additions	45	15	40	100
IV	Introduction to Major Field Crops	45	15	40	100
V	Seed Production of Vegetable, Tuber and Spice Crops	45	15	40	100
VI	Breeding & Seed Production of Ornamental Plants	45	15	40	100
VII	Communication Skills and Entrepreneurship Development	45	15	40	100
VIII	Apiculture, Sericulture & Lac Culture	45	15	40	100
<b>Total</b>					<b>800</b>

Punjabi University, Patiala  
Scheme of Studies and Syllabus for  
B.Sc. Agriculture (Horticulture) Part IV (Sem.VII & VIII)  
Session 2019-2020, 2020-2021 & 2021-22

**PART - IV (Semester-VIII)**

Subject Code	Subjects	Theory		Practical	Total
		External	Internal		
IX	Organic Farming of Horticultural Crops	45	15	40	100
X	Protected Cultivation of High Value Horticultural Crops	45	15	40	100
XI	Horticulture Business Management	45	15	40	100
XII	Mushroom Cultivation	45	15	40	100
XIII	Extension Methodology and Communication Skills for Technology Transfer	45	15	40	100
XIV	Personality Development and Communication Skills	45	15	40	100
<b>Rural Agricultural Work Experience (RAWEx)</b>					
	Reware Model	Duration (Weeks)		Marks	
XV	Orientation Village Attachment	2 Weeks (During Winter Break)		50	
	Agri-Clinics/Plant Health Clinics/Experiential Learning/Industrial Attachment/KVK/Visit to Agriculture University Project Report Preparation and Examination			150	
<b>Total</b>				<b>800</b>	

**SEMESTER-VII**

**PAPER-I: COMMERCIAL FLORICULTURE**

Max Marks: 100  
Theory: 45 marks  
Internal Assessment: 15 marks  
Practical: 40 marks

Duration of the Paper: 3 hrs  
Pass marks: 40% separately in  
theory and practical  
Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. History, definitions, scope and importance of commercial floriculture in India, aesthetic values
2. Nursery management, media for nursery, special nursery practices, growing environment, open cultivation, protected cultivation, soil requirements, artificial growing media, soil decontamination techniques, planting methods, influence of environmental parameters: light, temperature, moisture, humidity and CO<sub>2</sub> on growth and flowering.
3. Flower production – water and nutrient management, fertigation, weed management, rationing, training and pruning, disbudding, special horticultural practices, use of growth regulators, physiological disorders and remedies, IPM and IDM, production for exhibition purposes.
4. Importance, classification, design values and general cultivation aspects for ornamental plants viz. Annuals, biennales herbaceous perennials, grasses and bulbous ornamentals. shrubs, climbers, trees, indoor plants, palms and cycads, ferns and *Selaginella*, cacti and succulents.

**Section B**

5. Flower forcing and year-round flowering through physiological interventions, chemical regulation, environmental manipulation, Methods of delaying flower opening.
6. Cut flower standards and grades, harvest indices, harvesting techniques, post-harvest handling, Pre-cooling, pulsing, packing, Storage & transportation, marketing, export potential, institutional support,
7. Agri export zones, Production techniques of commercial flower crops: cut rose, cut chrysanthemum, carnation, gerbera, gladioli, tuberose, orchids, anthurium, aster, lilioms, bird of paradise, heliconia, alstroemeria, ornamental ginger, bromeliads, dahlia, gypsophilla, limonium, stock, cut foliage and fillers.
8. Floriculture industry: importance, area and production, industrial importance of ornamental plants and flowers. Scope of cut flowers in global trade, Global Scenario of cut flower production, Varietal wealth and diversity, area under cut flowers and production problems in India

**SEMESTER-VII**

**PAPER-I: COMMERCIAL FLORICULTURE**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Nursery preparation and growing of different ornamental flowers
2. Study and practice of different types of flower arrangements, preparation of floral bouquets, preparation of floral rangoli, veni etc.
3. Project report for export of flowers
4. Visit to nurseries and floriculture units.

**Suggested Reading:**

1. A.K. Singh. 2006. Flower crops, cultivation and management. New India publishing agency, Pitampura, New Delhi.
2. T.K. Bose, L.P. Yadav, P. Patil, P. Das and V.A. Partha Sarthy. 2003. Commercial flowers. Partha Sankar Basu, Nayaudyog, 206, Bidhan Sarani, Kolkata-700006
3. S.K. Bhattacharjee and L.C. De. 2003. Advanced Commercial Floriculture. Aavishkar Publishers, Distributors, Jaipur (Rajasthan) India.
4. Dewasish Choudhary and Amal Mehta. 2010. Flower crops cultivation and management. Oxford book company Jaipur, India.
5. Randhawa, G.S. Amitabha Mukhopadhyay, 2004. Floriculture in India. Allied Publishers Pvt. Ltd:

**SEMESTER-VII**

**PAPER-II: BREEDING OF VEGETABLE CROPS**

Max Marks: 100

Theory: 45 marks

Internal Assessment: 15 marks

Practical: 40 marks

Duration of the Paper: 3 hrs

Pass marks: 40% separately in  
theory and practical

Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. Origin, botany, taxonomy, evolution, distribution, cytogenetics, genetic resources, genetic divergence, types of pollination and fertilization mechanisms, sterility and incompatibility, anthesis and pollination
2. Breeding methods (introduction, selection, hybridization, mutation, marker assisted and QTLs), hybridization, inter-varietal, interspecific and inter-generic hybridization, heterosis breeding, inheritance pattern of traits, qualitative and quantitative, plant type concept and selection indices, varieties and varietal characterization
3. Genetics of spontaneous and induced mutations, problems and achievements of mutation breeding, ploidy breeding and its achievements, *in vitro* breeding
4. Breeding techniques for improving quality and processing characters; breeding for stresses, mechanism and genetics of resistance, breeding for salt, drought, low and high temperature; toxicity and water logging resistance biotechnology and their use in breeding in vegetable crops-Issue of patenting, PPVFR act.

**Section B**

5. Breeding objectives and breeding for biotic and abiotic stress resistance of: Potato and tomato, Eggplant,
6. Breeding objectives and breeding for biotic and abiotic stress resistance of: hot pepper, sweet pepper and okra,
7. Breeding objectives and breeding for biotic and abiotic stress resistance of: Peas and beans, amaranth, chenopods and lettuce, Gourds, melons, pumpkins and squashes
8. Breeding objectives and breeding for biotic and abiotic stress resistance of: Cabbage, cauliflower, carrot, beetroot, radish, sweet potato and tapioca

## SEMESTER-VII

### PAPER-II: BREEDING OF VEGETABLE CROPS

#### Practical

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Selfing and crossing techniques in vegetable crops
2. Hybrid seed production of vegetable crops in bulk.
3. Screening techniques for insect-pests, disease and environmental stress resistance in vegetable crops
4. Designing of breeding experiments
5. Screening techniques for abiotic stresses,
6. Screening and rating for pest, disease and nematode resistance
7. Estimation of quality and processing characters
8. Screening for-quality improvement,
9. Visit to breeding blocks.

#### Suggested Readings

1. Allard RW. 1999. *Principles of Plant Breeding*. John Wiley & Sons.
2. Chadha KL, Ravindran PN & Sahijram L. 2000. *Biotechnology in Horticultural and Plantation Crops*. Malhotra Publ. House.
3. Chadha KL. 2001. *Hand Book of Horticulture*. ICAR, New Delhi.
4. Dhillon BS, Tyagi RK, Saxena S & Randhawa GJ. 2005. *Plant Genetic Resources: Horticultural Crops*. Narosa Publ. House.
5. Fageria MS, Arya PS & Choudhary AK. 2000. *Vegetable Crops: Breeding and Seed Production*. Vol. I. Kalyani.
6. Hayward MD, Bosemark NO & Romagosa I. (Eds.). 1993. *Plant Breeding-Principles and Prospects*. Chapman & Hall.
7. Kalloo G. 1988. *Vegetable Breeding*. Vols. I-III. CRC Press.
8. Kaloo G & Singh K. 2001. *Emerging Scenario in Vegetable Research and Development*. Research Periodicals and Book Publ. House.
9. Kumar JC & Dhaliwal MS. 1990. *Techniques of Developing Hybrids in Vegetable Crops*. Agro Botanical Publ.
10. Paroda RS & Kalloo G. (Eds.). 1995. *Vegetable Research with Special Reference to Hybrid Technology in Asia-Pacific Region*. FAO.
11. Peter KV & Pradeep Kumar T. 2008. *Genetics and Breeding of Vegetables*. (Revised Ed.). ICAR.
12. Rai N & Rai M. 2006. *Heterosis Breeding in Vegetable Crops*. New India Publ. Agency.
13. Ram HH. 2001. *Vegetable Breeding: Principles and Practices*. Kalyani.
14. Singh PK, Dasgupta SK & Tripathi SK. 2004. *Hybrid Vegetable Development*. International Book Distributing Co.

**SEMESTER-VII**  
**PAPER-III: POST HARVEST MANAGEMENT OF HORTICULTURAL CROPS**  
**AND VALUE ADDITIONS**

Max Marks: 100

Theory: 45 marks

Internal Assessment: 15 marks

Practical: 40 marks

Duration of the Paper: 3 hrs

Pass marks: 40% separately in  
theory and practical

Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. Maturity indices, harvesting practices for specific market requirements, influence of pre-harvest practices, enzymatic and textural changes, respiration, transpiration.
2. Physiology and biochemistry of fruit ripening, ethylene evolution and ethylene management, factors leading to post-harvest loss, pre-cooling.
3. Treatments prior to shipment, viz., chlorination, waxing, chemicals, biocontrol agents and natural plant products.
4. Methods of storage ventilated, refrigerated, MAS, CA storage, physical injuries and disorders. Packing methods and transport, principles and methods of preservation, food processing, canning, fruit juices, beverages, pickles, jam, jellies, candies.

**Section B**

5. Dried and dehydrated products, nutritionally enriched products, fermented fruit beverages, packaging technology, processing waste management, food safety standards.
6. Cut flower standards and grades, harvest indices, harvesting techniques, post-harvest handling, Methods of delaying flower opening,
7. Pre-cooling, pulsing, packing, Storage & transportation, marketing, export potential, institutional support
8. Agri Export Zones for Cut rose, cut chrysanthemum, carnation, gerbera, gladioli, tuberose, orchids, anthurium, aster, liliiums, bird of paradise, heliconia, alstroemeria, alpinia, ornamental ginger, bromeliads, dahlia, gypsophilla, limonium, statice, stock, cut foliage and fillers.

**SEMESTER-VII**  
**PAPER-III: POST HARVEST MANAGEMENT OF HORTICULTURAL CROPS  
AND VALUE ADDITIONS**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Analyzing maturity stages of commercially important horticultural crops
2. Improved packing and storage of important horticultural commodities
3. Physiological loss in weight of fruits and vegetables
4. Estimation of transpiration, respiration rate, ethylene release and study of vase life extension in cut flower using chemicals
5. Estimation of quality characteristics in stored fruits and vegetables
6. Visit to cold storage and CA storage units,
7. Visit to fruit and vegetable processing units,
8. Evaluation of processed horticultural products.
9. Flower: harvesting techniques, post-harvest handling

**Suggested Readings**

1. Bhutani R.C. 2003. *Fruit and Vegetable Preservation*. Biotech Books.
2. Chadha KL & Pareek OP. (Eds.). 1996 *Advances in Horticulture*. Vol. IV. Malhotra Publ. House.
3. Haid NF & Salunkhe SK. 1997. *Post Harvest Physiology and Handling of Fruits and Vegetables*. Grenada Publ.
4. Mitra SK. 1997. *Post Harvest Physiology and Storage of Tropical and Sub-tropical Fruits*. CABI.
5. Ranganna S. 1997. *Hand Book of Analysis and Quality Control for Fruit and Vegetable Products*. Tata McGraw-Hill.
6. Sudheer KP & Indira V. 2007. *Post Harvest Technology of Horticultural Crops*. New India Publ. Agency.



**SEMESTER-VII**  
**PAPER-IV: INTRODUCTION TO MAJOR FIELD CROPS**

Max Marks: 100  
Theory: 45 marks  
Internal Assessment: 15 marks  
Practical: 40 marks

Duration of the Paper: 3 hrs  
Pass marks: 40% separately in  
theory and practical  
Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. Introduction, classification and distribution of field crops
2. Definitions and concept of multiple cropping, mixed cropping, intercropping, relay and alley cropping and crop rotation.
3. Origin, geographical distribution, economic importance of major field crops
4. Soil and climatic requirements, varieties, cultural practices and yield of crops: - Rice, Cotton and Maize.; Sunflower, Wheat and Sorghum.

**Section B**

5. Origin, history, area and production, classification, improved varieties, adaptability, economic importance, climate, soil, water and cultural requirements, varieties, yield nutrition, quality components, handling and processing of the produce for maximum production of Rabi cereals
6. Origin, history, area and production, classification, improved varieties, adaptability, economic importance, climate, soil, water and cultural requirements, varieties, yield nutrition, quality components, handling and processing of the produce for maximum production of Kharif cereals
7. Origin, history, area and production, classification, improved varieties, adaptability, economic importance, climate, soil, water and cultural requirements, varieties, yield nutrition, quality components, handling and processing of the produce for maximum production of Rabi pulses
8. Origin, history, area and production, classification, improved varieties, adaptability, economic importance, climate, soil, water and cultural requirements, varieties, yield nutrition, quality components, handling and processing of the produce for maximum production of oilseed and fodder crops

**SEMESTER-VII**  
**PAPER-IV: INTRODUCTION TO MAJOR FIELD CROPS**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Phenological studies at different growth stages of crop
2. Estimation of crop yield on the basis of yield attributes
3. Formulation of cropping schemes for various farm sizes and calculation of cropping and rotational intensities.
4. Working out growth indices (CER, CGR, RGR, NAR, LAD), aggressiveness, relative crowding coefficient, monetary yield advantage and ATER of prominent intercropping systems of different crops,
5. Estimation of protein content in pulses
6. Planning and layout of field experiments
7. Intercultural operations in different crops
8. Determination of cost of cultivation of different crops
9. Working out harvest index of various crops
10. Study of seed production techniques in various crops
11. Visit to nearby villages for identification of constraints in crop production

**Suggested Readings**

1. Das NR. 2007. *Introduction to Crops of India*. Scientific Publ.
2. Hunsigi G & Krishna KR. 1998. *Science of Field Crop Production*. Oxford & IBH.
3. Jeswani LM & Baldev B. 1997. *Advances in Pulse Production Technology*. ICAR.
4. Khare D & Bhale MS. 2000. *Seed Technology*. Scientific Publ.
5. Kumar Ranjeet & Singh NP. 2003. *Maize Production in India: Golden Grain in Transition*. IARI, New Delhi.
6. Prasad, Rajendra. 2002. *Text Book of Field Crop Production*. ICAR.
7. Singh C, Singh P & Singh R. 2003. *Modern Techniques of Raising Field Crops*. Oxford & IBH.

**SEMESTER-VII**

**PAPER-V: SEED PRODUCTION OF VEGETABLE, TUBER AND SPICE CROPS**

Max Marks: 100

Theory: 45 marks

Internal Assessment: 15 marks

Practical: 40 marks

Duration of the Paper: 3 hrs

Pass marks: 40% separately in  
theory and practical

Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. Introduction and history of seed industry in India. Definition of seed and its quality, classes-types of seed. Differences between grain and seed, new seed policies; DUS test, scope of vegetable seed industry in India.
2. Genetical and agronomical principles of seed production; methods of seed production; use of growth regulators and chemicals in vegetable seed production
3. Floral biology, pollination, breeding behaviour, seed development and maturation; methods of hybrid seed production.
4. Categories of seed; maintenance of nucleus, foundation and certified seed; seed certification, seed standards; seed act and law enforcement, plant quarantine and quality control.

**Section B**

5. Physiological maturity, seed harvesting, extraction, curing, drying, grading, seed processing, seed coating and pelleting, packaging (containers/packets), storage and cryopreservation of seeds, synthetic seed technology.
6. Principles of vegetable seed production. Role of temperature, humidity and light in vegetable seed production
7. Land requirements, climate, season, planting time, nursery management, seed rate, rouging, seed extraction and storage of cole crops, root vegetables, solanaceous vegetables, cucurbits, okra, leafy vegetables, bulb crops, leguminous vegetables and exotic vegetables, vegetatively propagated vegetables, bulb crops, leguminous vegetables and exotic vegetables.
8. Harvesting processing and storage of seeds, seed certification. Seed germination and purity analysis. Field and seed standards. Seed drying and extraction. Seed legislation.

**SEMESTER-VII**  
**PAPER-V: SEED PRODUCTION OF VEGETABLE, TUBER AND SPICE CROPS**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Study of seed structure, colour size, shape and texture.
2. Field inspection of seed crops.
3. Practices in rouging, harvesting and seed extraction.
4. Germination and purity analysis.
5. Methods of seed production
6. Study of floral biology and pollination in important species and cultivars.
7. Techniques of inducing polyploidy and mutation. Production of pure and hybrid seeds.
8. Harvesting, conditioning and testing of seeds.
9. Visit to seed production units.

**Suggested Readings:**

1. G.N. Kulkarni, 2002 Principles of Seed Technology. Kalyani Publishers, Ludhiana.
2. L.O. Copeland, 1999. Principles of Seed Science and Technology. Springer Publications.
3. P. Hazra and M.G. Som, 2009. Vegetable seed production and Hybrid Technology. Kalyani Publishers, Ludhiana.
4. Agarwal, P. K. 2010. Techniques in Seed Science and Technology. South Asian Publishers. New Delhi.
5. Arya, Prem Singh. 2003. Vegetable seed Production Principles. Kalyani Publishers. Ludhiana.
6. Fageria, M. S. 2011. Vegetable Crops- Breeding and Seed Production. Kalyani Publishers. Ludhiana.
7. Geetharani, P. 2007. Seed Technology in Horticultural Crops. NPH Publications Jodhpur.
8. Singh, S.P. 2001. Seed Production in Commercial Vegetables. Agrotech Publishing Academy, Udaipur.
9. Vanangamudi, K.2010. Vegetable Hybrid Seed Production and Management. Agrobios. Jodhpur.
10. Singh, Prabhakar. 2015. Seed Production Technology of vegetable. Daya Publishing House. New Delhi.
11. Raymond A.T., 2000. Vegetable Seed Production. Oxford University Press, USA
12. Prem Singh Arya, 2003. Vegetable breeding, production and seed production. Kalyani Publishers, New Delhi.
13. Singh, S.P. 2001. Seed production of commercial vegetables. Agrotech Publishing, Udaipur
14. Nemgal Singh, P.K. Singh, Y.K. Singh and Virendra kumar, 2006. Vegetable Seed Production Technology. International book distributing co., Lucknow.
15. Khare, D. and Bhole, M.S. 2000. Seed Technology. Scientific Publishers (India) Jodhpur.

**SEMESTER-VII**

**PAPER-VI: BREEDING & SEED PRODUCTION OF ORNAMENTAL PLANTS**

Max Marks: 100

Theory: 45 marks

Internal Assessment: 15 marks

Practical: 40 marks

Duration of the Paper: 3 hrs

Pass marks: 40% separately in  
theory and practical

Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. History of improvements of ornamental plants, Centre of origin of flower crops and ornamental crops
2. Objectives and techniques of breeding Jasmine, Chrysanthemum, Tuberose, Gerbera, Gladiolus, dahlia Heliconia,
3. Objectives and techniques of breeding Liliium, Gaillardia, Petunia, Hibiscus, Bougainvillea, Zinnia, Cosmos, Dianthus, Snapdragon, Pansy,
4. Objectives and techniques of breeding Crossandra, marigold, geranium, antirrhinum, china aster, orchids, anthurium, carnation, hibiscus etc.

**Section B**

5. Breeding for disease resistance. Development of promising cultivars of important ornamentals and flower crops.
6. Role of heterosis and its exploitation, production of F1 hybrids and utilization of male sterility, production of open pollinated seed.
7. Harvesting, processing, grading, packing and storage of seeds.
8. Seed certification and marketing of flower seeds, steps involved in export of flower seeds

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**SEMESTER-VII**

**PAPER-VI: BREEDING & SEED PRODUCTION OF ORNAMENTAL PLANTS**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Study of floral biology and pollination in important species and cultivars.
2. Techniques of inducing polyploidy and mutation.
3. Production of pure and hybrid seeds.
4. Harvesting, conditioning and testing of seeds.
5. Practice in seed production methods.

**Suggested Readings**

1. T.K. Bose, L.P. Yadav, P. Patil, P. Das and V.A. Partha Sarthy. 2003. Commercial flowers.
2. Partha Sankar Basu, Nayaudyog, 2006, Bidhan Sarani, Kolkata-700006.
3. S.K. Bhattacharjee and L.C. De. 2003. Advanced Commercial Floriculture. Aavishkar Publishers, Distributors, Jaipur (Rajasthan) India.
4. D.J. Callaway and M.B. Callaway. 2000. Breeding Ornamental Plants. Timber Press
5. R.L. Agarwal. 1996. Seed Technology. Oxford & IBH Publishers, New Delhi
6. P.K. Agarwal. 1994. Principles of Seed Technology. ICAR Publication, New Delhi

**SEMESTER-VII**

**PAPER VII: COMMUNICATION SKILLS AND ENTREPRENEURSHIP DEVELOPMENT**

Max Marks: 100

Theory: 45 marks

Internal Assessment: 15 marks

Practical: 40 marks

Duration of the Paper: 3 hrs

Pass marks: 40% separately in  
theory and practical

Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. Communication: meaning and definition; Principles and Functions of Communication, models and barriers to communication.
2. Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories.
3. Communication Skills: meaning and process of communication, verbal and non-verbal communication; listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures.
4. Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations, impromptu presentation, public speaking; Group discussion. Organizing seminars and conferences

**Section B**

5. Entrepreneurship Development: Assessing overall business environment in the Indian economy. Overview of Indian social, political and economic systems and their implications for decision making by individual entrepreneurs. Globalization and the emerging business /entrepreneurial environment.
6. Concept of entrepreneurship; entrepreneurial and managerial characteristics; managing an enterprise; motivation and entrepreneurship development; importance of planning, monitoring, evaluation and follow up; managing competition; entrepreneurship development programs; SWOT analysis, Generation, incubation and commercialization of ideas and innovations.
7. Government schemes and incentives for promotion of entrepreneurship. Government policy on Small and Medium Enterprises (SMEs) / SSIs. Export and Import Policies relevant to horticulture sector. Venture capital.
8. Contract farming and joint ventures, public-private partnerships. Supply chain management and total quality management. Overview of horti inputs industry. Characteristics of Indian horticultural processing and export industry. Social Responsibility of Business.

**SEMESTER-VII**

**PAPER VII: COMMUNICATION SKILLS AND ENTREPRENEURSHIP DEVELOPMENT**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. To get acquainted with university extension system.
2. Group discussion- exercise; handling and use of audio visual equipments and digital camera and LCD projector; preparation and use of AV aids,
3. Preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories;
4. Presentation skills exercise; micro teaching exercise
5. A visit to village to understand the problems being encountered by the villagers/ farmer
6. To study organization and functioning of DRDA and other development departments at district level
7. Visit to NGO and learning from their experience in rural development
8. Understanding PRA techniques and their application in village development planning
9. Visit to community radio and television studio for understanding the process of programme production; script writing, writing for print and electronic media, developing script for radio and television.
10. Listening and note taking, writing skills, oral presentation skill
11. Field diary and lab record; indexing, footnote and bibliographic procedures.
12. Reading and comprehension of general and technical articles

**Suggested Readings**

1. Chandrakandan KM, Senthil Kumar & Swatilaxmi. PS. 2005. *Extension Education What? And What Not ?* RBSA Publ.
2. Gallagher K. 1999. *Farmers Field School (FFS) – A Group Extension Process based on Non-Formal Education Methods*. Global EPM Facility, FAO.
3. Ganesan R, Iqbal IM & Anandaraja N. 2003. *Reaching the Unreached: Basics of Extension Education*. Associated Publishing Co.
4. Jalihal KA & Veerabhadraiah V. 2007. *Fundamentals of Extension Education and Management in Extension*. Concept Publ.
5. Khan PM. 2002. *Textbook of Extension Education*. Himalaya Publ.
6. Ray GL. 2006. *Extension Communication and Management*. Kalyani Publ.
7. Van Den Ban AW & Hawkins HS. 1998. *Agricultural Extension* .2<sup>nd</sup> Ed. CBS.
8. Viswanathan M. 1994. *Women in Agriculture and Rural Development*. Printwell Publ.



Punjabi University, Patiala  
Scheme of Studies and Syllabus for  
B.Sc. Agriculture (Horticulture) Part IV (Sem.VII & VIII)  
Session 2019-2020, 2020-2021 & 2021-22

**SEMESTER-VII**  
**PAPER VIII: APICULTURE, SERICULTURE & LAC CULTURE**

Max Marks: 100  
Theory: 45 marks  
Internal Assessment: 15 marks  
Practical: 40 marks

Duration of the Paper: 3 hrs  
Pass marks: 40% separately in  
theory and practical  
Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. Introduction to beneficial insects. Importance and History of apiculture. Species of honeybees, Rock bee, Little bee, Indian bee, European bee, Italian bee and Dammar bee
2. Lifecycle and caste determination. Bee colony maintenance, bee colony activities, starting of new colony, location site, transferring colony, replacement of queen, combining colonies, swarm prevention, colony management in different seasons
3. Equipment for apiary, types of beehives and their description. Bee pasturage. Honey extraction, honey composition and value, bee wax and tissues.
4. Lac growing areas in India, Lac insects, biology, behaviour, lac cultivation, food plants, pruning, inoculation, cropping, kinds of lac. Enemies of lac-insects.

**Section B**

5. Importance, history and development of sericulture in India, silkworms' kinds and their hosts, systematic position, distribution, lifecycles in brief, Silk glands.
6. Mulberry silkworm-morphological features, races, rearing house and equipments, disinfection and hygiene. Grainage acid treatment, packing and transportation of eggs, Incubation, black boxing, hatching of eggs. Silkworm rearing young age /chawki rearing and old age rearing of silkworms.
7. Feeding, spacing, environmental conditions and sanitation. Cocoon characters colour, shape, hardiness and shell ratio. Defective cocoons and stifling of cocoons.
8. Uses of silk and by-products. Economics of silk production. Moriculture-Mulberry varieties, package of practices, Pests and diseases and their management. Fisheries resources of India, commercial important brackish water and freshwater fish and their production.

Punjabi University, Patiala  
Scheme of Studies and Syllabus for  
B.Sc. Agriculture (Horticulture) Part IV (Sem. VII & VIII)  
Session 2019-2020, 2020-2021 & 2021-22

**SEMESTER-VII**  
**PAPER VIII: APICULTURE, SERICULTURE & LAC CULTURE**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Honeybee colony, different beehives and apiculture equipment.
2. Summer and Winter management of colony.
3. Honey extraction and bottling.
4. Study of pests and diseases of honeybees. Establishment of mulberry garden.
5. Preparation of mulberry cuttings, planting methods under irrigated and rainfed conditions. Maintenance of mulberry garden-pruning, fertilization, irrigation and leaf harvest.
6. Mulberry pests and diseases and their management and nutritional disorders.
7. Study of different kinds of silkworms and mulberry silkworm morphology, silk glands. Sericulture equipments for silkworm rearing.
8. Mulberry silkworm rearing room requirements. Rearing of silkworms-chalky rearing.
9. Rearing of silkworms late age silkworm rearing and study of montages.
10. Study of silkworm pests, diseases and their management.
11. Lac insects-biology, behaviour, lac cultivation, food plants, pruning, inoculation, cropping, kinds of lac.
12. Enemies of lac insects.

**Suggested Readings**

1. Singh, S. 1975 Bee keeping in India – ICAR, New Delhi.
2. Sunita, N.D, Guled ,M.B, Mulla S.R and Jagginavar,2003, Beekeeping, UAS Dharwad.
3. Mishra, R.C. and Rajesh Gar. 2002. Prospective in Indian Apiculture. Agrobios, Jodhpur.
4. Singh, D and Singh, D.P. 2006. A hand book of Beekeeping, Agrobios (India).
5. Paul DeBach and Devid Rosen 1991. Biological control by natural enemies. Cambridge University Press; 2 edition (27 June 1991)
6. YA Shinde and BR Patel. Sericulture in India
7. Tribhuwan Singh. Principles and Techniques of Silkworm Seed Production, Discovery publishing House Pvt. Ltd
8. M.L. Narasaiah. Problems and Prospects of Sericulture. discovery publishing House Pvt. Ltd.
9. Ganga,G. and Sulochana Chetty, J. 1997. An introduction to Sericulture (2nd Edn.). Oxford & IBH publishing Co. Pvt. Ltd., New Delhi.
10. Krishnaswamy, S. (Ed). 1978. Sericulture Manual - Silkworm Rearing. FAO Agrl. Services bulletin, Rome.
11. Singh, S. 1975. Bee keeping in India. ICAR, New Delhi.
12. Glover, P.M. 1937. Lac cultivation in India. Indian Lac Research Institute, Ranchi.
13. Jolly, M.S. 1987. “Appropriate sericulture techniques” International centre for training and Research in Tropical Sericulture, Mysore, 209.
14. K.P.Srivastava .A Text Book on Applied Entomology Vol. I&II. , Kalyani Publishers, Ludhiyana
15. B.R. David and V.V.Ramamurthy. Elements of Economic Entomology, 7th Edition. Namrutha Publications, Chennai

**SEMESTER-VIII**

**PAPER IX: ORGANIC FARMING OF HORTICULTURAL CROPS**

Max Marks: 100  
Theory: 45 marks  
Internal Assessment: 15 marks  
Practical: 40 marks

Duration of the Paper: 3 hrs  
Pass marks: 40% separately in  
theory and practical  
Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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; Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture
2. Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming;
3. Fundamentals of insect, pest, disease and weed management under organic mode of production; Operational structure of NPOP
4. Certification process and standards of organic farming; Processing, levelling, economic considerations and viability, marketing and export potential of organic products.

**Section B**

5. Introduction, concept, relevance in present context to horticultural produce; Organic product requirements
6. Biological intensive nutrient management-organic manures, vermicomposting, green manuring, recycling of organic residues, biofertilizers; Soil improvement and amendment
7. Integrated diseases and pest management – use of biocontrol agents, biopesticides pheromones, trap crops, bird perches; Weed management
8. Quality considerations, certification, labelling and accreditation processors, marketing, exports of horticultural crops

**SEMESTER-VIII**  
**PAPER IX: ORGANIC FARMING OF HORTICULTURAL CROPS**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Raising of vegetable crops organically through nutrient, diseases and pest management.
2. Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis
3. Vermicomposting
4. Vegetable and ornamental nursery raising
5. Grading, packaging, post-harvest management.
6. Visit of organic farms to study the various components and their utilization

**Suggested Readings**

1. A K Dahama. 2007. Organic farming for sustainable agriculture. Agrobios (India), Jodhpur.
2. Arun. K. Sharma. 2011. Handbook of Organic farming. Agrobios (India), Jodhpur.
3. S.P. Palaniappan and K. Annadurai. 2010. Organic farming – Theory and Practice. Scientific Publishers. Jodhpur.
4. U. Thapa and P. Tripathy. 2006. Organic farming in India- Problems and Prospects. Agrotech Publishing agency, Udaipur.
5. G.K. Veeresh. 2006. Organic farming. Foundation Books. New Delhi.
6. Purshit, S.S. 2006. Trends in Organic Farming in India. Agrobios(INDIA), Jodhpur.
7. Sathe, T.V. 2004. Vermiculture and Organic Farming. Days Publishing House, New Delhi.

**SEMESTER VIII**  
**PAPER X: PROTECTED CULTIVATION OF HIGH VALUE HORTICULTURAL CROPS**

Max Marks: 100

Theory: 45 marks

Internal Assessment: 15 marks

Practical: 40 marks

Duration of the Paper: 3 hrs

Pass marks: 40% separately in theory and practical

Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. Importance and scope of protected cultivation of vegetable crops; principles used in protected cultivation, energy management, low cost structures; training methods; engineering aspects.
2. Prospects of protected floriculture in India, Regulatory structures used in protected structures; types of greenhouse/poly house/net house; Designing and erection of protected structures; Low cost/Medium cost/High cost structures–economics of cultivation; Location specific designs;
3. Hot beds, cold frames, effect of environmental factors, *viz.* temperature, light, CO<sub>2</sub> and humidity on growth of different vegetables, manipulation of CO<sub>2</sub>, light and temperature for vegetable production, fertigation.
4. Nursery raising in protected structures like poly-tunnels, types of benches and containers, different media for growing nursery under cover.

**Section B**

5. Regulation of flowering and fruiting in vegetable crops, technology for raising tomato, sweet pepper, cucumber and other vegetables in protected structures, training and staking in protected crops, varieties and hybrids for growing vegetables in protected structures.
6. Problem of growing vegetables in protected structures and their remedies, insect and disease management in protected structures; soil-less culture, use of protected structures for seed production.
7. Structural components suitable flower crops for protected cultivation, Environment control – management and manipulation of temperature, light, humidity, air and CO<sub>2</sub>; Heating and cooling systems, ventilation, naturally ventilated greenhouses, fan and pad cooled greenhouses, light regulation. Containers and substrates, soil decontamination, layout of drip and fertigation system, water and nutrient management, weed management, physiological disorders, IPM and IDM.
8. Crop regulation by chemical methods and special horticultural practices (pinching, disbudding, deshooting, deblossoming, etc.); Staking and netting, Photoperiod regulation. Harvest indices, harvesting techniques, post-harvest handling techniques, Precooling, sorting, grading, packing, storage, quality standards.

**SEMESTER VIII**  
**PAPER X: PROTECTED CULTIVATION OF HIGH VALUE HORTICULTURAL CROPS**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Types of protected cultivation
2. Designing of polyhouse, net house, glasshouse
3. Cost of establishment of a mist chamber, greenhouse, glasshouse, polyhouse and their maintenance.
4. Nutrient and plant protection applications during nursery.
5. Use of mist chamber in propagation and hardening of plants.

**SEMESTER-VIII**  
**PAPER XI: HORTICULTURE BUSINESS MANAGEMENT**

Max Marks: 100  
Theory: 45 marks  
Internal Assessment: 15 marks  
Practical: 40 marks

Duration of the Paper: 3 hrs  
Pass marks: 40% separately in  
theory and practical  
Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. Transformation of agriculture into agribusiness, various stakeholders and components of agribusiness systems. Importance of agribusiness in the Indian economy and New Agricultural Policy.
2. Distinctive features of Agribusiness Management: Importance and needs of agro-based industries, Classification of industries and types of agro based industries.
3. Institutional arrangement, procedures to set up agro based industries. Constraints in establishing agro-based industries. Agri-value chain: Understanding primary and support activities and their linkages.
4. Business environment: PEST & SWOT analysis. Management functions: Roles & activities, Organization culture.

**Section B**

5. Planning, meaning, definition, types of plans. Purpose or mission, goals or objectives, Strategies, policies procedures, rules, programs and budget. Components of a business plan, Steps in planning and implementation.
6. Organization staffing, directing and motivation. Ordering, leading, supervision, communications, control.
7. Capital Management and Financial management of Agribusiness. Financial statements and their importance. Marketing Management: Segmentation, targeting & positioning. Marketing mix and marketing strategies. Consumer behavior analysis, Product Life Cycle (PLC).
8. Sales & Distribution Management. Pricing policy, various pricing methods. Project Management definition, project cycle, identification, formulation, appraisal, implementation, monitoring and evaluation. Project Appraisal and evaluation techniques.

**SEMESTER VIII**  
**PAPER XI: HORTICULTURE BUSINESS MANAGEMENT**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Study of agri-input markets: Seed, fertilizers, pesticides.
2. Study of output markets: grains, fruits, vegetables, flowers.
3. Study of product markets, retails trade commodity trading, and value-added products.
4. Study of financing institutions- Cooperative, Commercial banks, RRBs, Agribusiness Finance Limited, NABARD.
5. Preparations of projects and Feasibility reports for agribusiness entrepreneur.
6. Appraisal/evaluation techniques of identifying viable project- Non-discounting techniques.
7. Case study of Agro-based industries.



**SEMESTER VIII**

**PAPER XII: MUSHROOM CULTIVATION**

Max Marks: 100

Theory: 45 marks

Internal Assessment: 15 marks

Practical: 40 marks

Duration of the Paper: 3 hrs

Pass marks: 40% separately in  
theory and practical

Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. Historical development of mushroom cultivation and present status, taxonomy, classification, food, medicinal value, uses of mushroom, edible and poisonous mushrooms.
2. Life cycle of cultivated mushrooms, reproduction and strain improvement, maintenance of pure culture, facilities required for establishing commercial spawn lab.
3. Preparation of substrate for mushroom cultivation, preparation and maintenance of spawn
4. Long, short and indoor composting methods, formulae for different composts and their computation, qualities and testing of compost, uses of spent mushroom compost/substrate.

**Section B**

5. Facilities for setting up mushroom farm for seasonal and environmentally control cultivation, requirement and maintenance of temperature, relative humidity, CO<sub>2</sub>, ventilation in cropping rooms
6. Cultivation technology of *Agaricus bisporus*, *Pleurotus* sp., *Calocybe indica*, *Lentinus edodes* and *Ganoderma lucidum*.
7. Insect pests, diseases and abnormalities of cultivated mushroom and their management
8. Post-harvest processing and value addition, economics of mushroom cultivation, biotechnology and mushroom cultivation.

**SEMESTER-VIII**

**PAPER XII: MUSHROOM CULTIVATION**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Preparation of spawn, compost, spawning, casing, harvesting and postharvest handling of edible mushroom
2. Identification of various pathogens
3. Competitors of various mushrooms.

**Suggested Readings**

1. Chadha KL & Sharma SR. 2001. Advances in Horticulture (Mushroom). Vol. XIII. Malhotra Publ. House, New Delhi.
2. Chang ST & Hays WA. 1997. The Biology and Cultivation of Edible Mushrooms. Academic Press, New York.
3. Chang ST & Miles PG. 2002. Edible Mushrooms and their Cultivation. CRC Press, Florida.
4. Kapur JN. 1989. Mushroom Cultivation. DIPA, ICAR, New Delhi.
5. Dhar BL. 2005. Cultivation Technology of High Temperature Tolerant
6. White Button Mushroom. DIPA, ICAR, New Delhi.

**SEMESTER-VIII**  
**PAPER XIII: EXTENSION METHODOLOGY AND COMMUNICATION SKILLS**  
**FOR TECHNOLOGY TRANSFER**

Max Marks: 100  
Theory: 45 marks  
Internal Assessment: 15 marks  
Practical: 40 marks

Duration of the Paper: 3 hrs  
Pass marks: 40% separately in  
theory and practical  
Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. Education: Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education
2. Extension Programme planning- Meaning, Process, Principles and Steps in Programme Development. Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era (Etawah Pilot Project, Nilokheri Experiment, etc.); various extension/ agriculture development programmes launched by ICAR/ Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND,NATP, NAIP, etc.).
3. New trends in agriculture extension: privatization extension, cyber extension/ extension, market-led extension, farmer-led extension, expert systems, etc.
4. Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Dev.-meaning, definition, concept & principles, Philosophy of C.D. Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions.

**Section B**

5. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: concept and models, capacity building of extension personnel
6. Extension teaching methods: meaning, classification, individual, group and mass contact methods, ICT Applications in TOT (New and Social Media), media mix strategies; communication: meaning and definition; Principles and Functions of Communication, models and barriers to communication.
7. Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories. Communication, verbal and nonverbal communication; listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures.
8. Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations, impromptu presentation, public speaking; Group discussion. Organizing seminars and conferences.

**SEMESTER VIII**  
**PAPER XIII: EXTENSION METHODOLOGY AND COMMUNICATION SKILLS**  
**FOR TECHNOLOGY TRANSFER**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. To get acquainted with university extension system.
2. Group discussion- exercise; handling and use of audio visual equipments and digital camera and LCD projector; preparation and use of AV aids,
3. Preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories;
4. Presentation skills exercise; micro teaching exercise
5. A visit to village to understand the problems being encountered by the villagers/ farmer
6. To study organization and functioning of DRDA and other development departments at district level
7. Visit to NGO and learning from their experience in rural development
8. Understanding PRA techniques and their application in village development planning
9. Visit to community radio and television studio for understanding the process of programme production; script writing, writing for print and electronic media, developing script for radio and television.
10. Listening and note taking, writing skills, oral presentation skill
11. Field diary and lab record; indexing, footnote and bibliographic procedures.
12. Reading and comprehension of general and technical articles

**Suggested Readings**

1. Chandrakandan KM, Senthil Kumar & Swatilaxmi. PS. 2005. *Extension Education What? And What Not ?* RBSA Publ.
2. Gallagher K. 1999. *Farmers Field School (FFS) – A Group Extension Process based on Non-Formal Education Methods*. Global EPM Facility, FAO.
3. Ganesan R, Iqbal IM & Anandaraja N. 2003. *Reaching the Unreached: Basics of Extension Education*. Associated Publishing Co.
4. Jalihal KA & Veerabhadraiah V. 2007. *Fundamentals of Extension Education and Management in Extension*. Concept Publ.
5. Khan PM. 2002. *Textbook of Extension Education*. Himalaya Publ.
6. Ray GL. 2006. *Extension Communication and Management*. Kalyani Publ.
7. Van Den Ban AW & Hawkins HS. 1998. *Agricultural Extension* .2<sup>nd</sup> Ed. CBS.
8. Viswanathan M. 1994. *Women in Agriculture and Rural Development*. Printwell Publ.

**SEMESTER-VIII**

**PAPER XIV: PERSONALITY DEVELOPMENT AND COMMUNICATION SKILLS**

Max Marks: 100  
Theory: 45 marks  
Internal Assessment: 15 marks  
Practical: 40 marks

Duration of the Paper: 3 hrs  
Pass marks: 40% separately in  
theory and practical  
Teaching hours: 4 per week

**THEORY**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Section A and B each will have four questions from the respective sections of the syllabus. Each question from Section A will carry 7 marks while each question from Section B will carry 7½ marks. The section C, which will cover the entire syllabus uniformly, will consist of 8 short answer type questions each of 2 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

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

**Section A**

1. Communication skills: Structural and functional grammar; meaning and process of communication, verbal and nonverbal communication; listening and note taking,
2. Writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures.
3. Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations, impromptu presentation, public speaking;
4. Group discussion. Organizing seminars and conferences.

**Section B**

5. Nature, Scope and Significance of Organizational Behaviour;
6. Evolution and Historical Background of Organizational Behaviour;
7. Models of Organizational Behaviour Foundations of individual behaviour,
8. Diversity, Micro Organizational behaviour - Personality, self-concept, self-esteem and Self-Efficacy; Attitudes, Perception, Power – types & structures.

Punjabi University, Patiala  
Scheme of Studies and Syllabus for  
B.Sc. Agriculture (Horticulture) Part IV (Sem.VII & VIII)  
Session 2019-2020, 2020-2021 & 2021-22

**SEMESTER VIII**

**PAPER XIV: PERSONALITY DEVELOPMENT AND COMMUNICATION SKILLS**

**Practical**

Maximum Marks: 40

Time: 3 hours

Pass Marks: 40%

Teaching hours: 4 hours per week

1. Listening and note taking, writing skills,
2. Oral presentation skills.
3. Field diary and lab record; indexing, footnote and bibliographic procedures.
4. Reading and comprehension of general and technical articles.