

List of Credit Courses to be implemented in M.Sc. (Ag.) Horticulture Programme

at

Udai Pratap Autonomous College, Varanasi

Ist Semester

Course No.	Course Title	Credits
Hort – 501	Fundamentals of Fruit Production	4(3+1)
Hort – 502	Fundamentals of Vegetable Production	4(3+1)
Hort – 503	Nursery Husbandry and Plant Propagation	4(3+1)
AGSTAT - 501	Agricultural Statistics	3(3+0)
		15 Credits

IInd Semester

Course No.	Course Title	Credits
Hort – 505	Fruit Production	4(3+1)
Hort – 506	Vegetable Production	4(3+1)
Hort – 507	Ornamental Gardening	4(3+1)
AGSTAT - 502	Agricultural Statistics	3(3+0)
		15 Credits

IIIrd Semester

Course No.	Course Title	Credits
Hort – 508	Principles of Fruits and Vegetables Preservation	3(2+1)
Hort – 509	Plantation Crops	3(2+1)
Hort – 510	Vegetable Breeding	3(2+1)
	Thesis	6
		15 Credits

IVth Semester

Course No.	Course Title	Credits
Hort – 511	Seed Production Technology of Vegetable Crops	3(2+1)
Hort – 512	Commercial Floriculture	3(2+1)
	Thesis	6
		15 Credits
	Total	60 Credits
	Seminar	01
	Grand Total	61

M.Sc. (Ag.) I – Semester

Course Title: Fundamentals of Fruit Production

Course No.: HOR-501

Credit Hour – 4 (3+1)

Syllabus

Importance and scope of fruit production. Environmental factors affecting fruit production. Nutrition of fruit crops, leaf analysis and fertilizer recommendation. Water and weed management in fruit production. Response of fruit plant to excess and deficiency of nutrient and moisture. Chilling requirement of temperate fruit plant, pruning and training. Growth and fruiting behavior of fruit plants. Pollination, fruit set, fruit development and fruit drop. Unfruitfulness, parthenocarpy and seedlessness, alternate bearing. Use of growth regulators in fruit production. Harvesting, grading, packaging, transport and marketing of fruits.

Practical:

- 1- Identification of horticultural tools and implements and their uses.
- 2- Identification of tropical, sub tropical and temperate zone fruits.
- 3- Methods of training and pruning in fruit plants.
- 4- Irrigation system followed in orchard
- 5- Fertilizer application in fruit crops including fertigation.
- 6- Visit of local commercial orchard.
- 7- Fruit behavior of fruit plant.
- 8- Use of growth regulators.
- 9- Post harvest handling and marketing of fruits.
- 10- Preparation for establishing commercial orchard.

M.Sc. (Ag.) I – Semester

Course Title: Fundamentals of Vegetable Production

Course No.: HOR-502

Credit Hour – 4 (3+1)

Syllabus

Importance of vegetable in human nutrition and as a source of income to vegetable growers. Area, production, productivity and potentiality of vegetable production for domestic market as well as export. Type of vegetable garden. Classification of vegetable crop, Environmental factors influencing vegetable production. Role of plant nutrient and growth regulators in vegetable production. Nursery techniques, preparation of land, organic manures, fertilizers and method of their application, spacing, transplanting, irrigation practices, intercultural, mulching and control of weeds, crop rotation, succession and intercropping. Harvesting, handling, grading, packaging, transport and storage.

Practical:

1. Layout of kitchen garden.
2. Identification of horticultural tools and implements and their uses.
3. Identification of cool and summer season vegetables.
4. Role of plant nutrients in vegetable production.
5. Use of PGR in vegetable production.
6. Classification of vegetable crops.
7. Raising of vegetable nurseries.
8. Preparation of cropping scheme for commercial farm and kitchen garden
9. Irrigation system followed in vegetable production.
10. Fertilizer application in vegetable production.
11. Visit of commercial greenhouse/poly house.

M.Sc. (Ag.) I – Semester

Course Title: Nursery Husbandry and Plant Propagation

Course No.: HOR-503

Credit Hour – 4 (3+1)

Syllabus

Selection of site and nursery layout. Nursery of different fruit trees, ornamental plant, vegetable and forest tree. Dormancy of seed and physiology of seed germination. Selection, certification and maintenance of mother plants and bud wood. Polyembryony and its importance. Root stock and stionic effect in fruit crops. Seed and nursery act. Basic concept and principles of plant propagation, plant growing structure, glass houses, mist chamber etc. budding, grafting, cutting and layering in fruit plants. Anatomy and physiology of root formation and graft union. Advances in the technique of plant propagation and equipment. Micro propagation of fruits, vegetables and flowers.

Practical:

1. Prepare layout of nursery for ornamental plants, vegetables, fruits and forest trees.
2. Identification of ornamental plants (Trees, shrubs, climbers, foliage, succulents, palms etc.)
3. Polyembryony and its importance.
4. Root stocks used in fruit crops.
5. Propagation by cutting (soft wood, semi hard wood, hard wood).
6. Propagation by layering (simple layering, air layering and stooling).
7. Propagation by budding and grafting.
8. Study of various plant growth structures.
9. Visit to commercial green house.

M.Sc. (Ag.) II – Semester

Course Title: Fruit Production

Course No.: HOR-505

Credit Hour – 4 (3+1)

Syllabus

Origin, botany, distribution, classification, varieties, soil and climatic requirements. Root stocks, propagating, planting, training and pruning. Manuring, irrigation and weed control, flowering and fruiting, harvesting, pest and diseases and their control in tropical fruits such as mango, banana, papaya, pineapple, sapota, cashewnut and sub tropical fruits such as citrus, grapes, guava, carambola, fig, jamun, karonda (Carissa), litchi, loquat, jackfruit, pomegranate, phalsa and durian.

Dormancy, flowering, fruiting, chilling requirement and harvesting of temperate fruits such as apple, pear, peach, plum, apricot, walnut, strawberry, pecan nut and kiwi fruit.

Practical:

1. Identification of horticultural tools and implements and their uses.
2. Plant propagation, scarification and stratification.
3. Training and pruning in fruit plants.
4. Identification and description of varieties of fruit crops.
5. Preparation for establishing commercial orchard.
6. Economics of fruit crops.
7. Visit to tropical, sub tropical and temperate orchards.

M.Sc. (Ag.) II – Semester

Course Title: Vegetable Production

Course No.: HOR-506

Credit Hour – 4 (3+1)

Syllabus

Introduction, detailed study of origin and history, distribution, area and production, nutritive value, improved varieties, climate and soil requirement, nursery techniques, sowing/planting. Nutritional requirement, irrigation, intercropping, weed control, plant protection, harvesting, grading, packaging and storage of important cool season vegetable crops such as cabbage, cauliflower, knol-khol, beet root, radish, turnip, carrot, garden pea, onion, garlic, potato, palak and lettuce and important warm season vegetable crops such as brinjal, hot and sweet pepper, tomato, beans, cowpea, cucumbers, melons, pumpkin, squash and gourd, leafy vegetables, sweet potato, cassava and yam. Problem and solutions in production of these vegetable crops.

Practical:

1. Planning of layout of kitchen garden.
2. Identification of important vegetable seeds and plants.
3. Raising of vegetable nursery.
4. Grading and packaging of vegetable.
5. Cultural operations of cool and summer season vegetable crops.
6. Study of physiological disorders and deficiency of mineral elements.
7. Identification of important pests and diseases and their control.
8. Preparation of cropping scheme for commercial farms.
9. Post harvest handling of vegetable crops.
10. Economics of vegetable crops.

M.Sc. (Ag.) II – Semester

Course Title: Ornamental Gardening

Course No.: HOR-507

Credit Hour – 4 (3+1)

Syllabus

History of garden, principles of gardening, element of design, different type and style of gardening, different components (features) of a garden such as fences, drive ways, paths, steps, hedge and edge plants, topiary, arches, pergolas, terrace gardening, paves garden, drywall, carpet lawn, bedding, flower bed, shrubbery borders, avenue trees, rock garden, water garden, roof garden, green house conservatory and lath house.

Practical:

1. Identification and selection of ornamental plants (Trees, shrubs, climbers, foliage, hedge, edge plants, etc.).
2. Planning and layout of garden and garden designs for public and private area.
3. Layout for avenue planting.
4. Planting herbaceous and shrubbery borders.
5. Visit to parks and botanical garden.
6. Layout of lawns and their maintenance.

M.Sc. (Ag.) III – Semester

Course Title: Principle of Fruit and Vegetable Preservation

Course No.: HOR-508

Credit Hour – 3 (2+1)

Syllabus

Scope and importance for preservation industry in India, spoilage of fruit and vegetable produce. Principles and methods of preservation and processing eg. Canning, freezing, dehydration, preserves, cordial, sauce, puree, squash, jam, jelly, marmalades, pickles and various vegetable products. Fruit and vegetable processing and preservation as an industry. Equipment and techniques in freezing of fruits and vegetable, juice and puries. Methods of storing of fresh and preserved products. Quality control during processing. Fruit products order. Laboratory examination including physical, chemical and organoleptic tests of processed fruits and vegetables.

Microbiology as applies to preservation, enzyme, general properties and its importance. Establishment of preservation factory, location, factory planning, equipments and maintenance.

Detailed studies of the problems in connection with various methods of preservation and processing. Studies of changes taking place in various products.

Practical:

1. Identification of equipments used in fruit and vegetable preservation.
2. Improved packing and storage of important horticultural commodities.
3. Estimation of quality characteristics in stored fruits and vegetables.
4. Preparation of beverages (Cordial, squash etc.).
5. Preparation of pectin products (jam, jelly, marmalades).
6. Preparation of preserves.
7. Preparation of tomato products (sauce, chutney, puree etc.).
8. Visit to fruit and vegetable processing unit.
9. Evaluation of processed horticultural products economics.
10. Preservation by drying and dehydration.

M.Sc. (Ag.) III – Semester

Course Title: Plantation Crops

Course No.: HOR-509

Credit Hour – 3 (2+1)

Syllabus

Detailed study regarding origin, history, distribution, economics, taxonomy, classification, variation, climate and soil requirements, propagation and nursery techniques, cultural practices, nutrition, water requirement, training and pruning system, regulation of shade, plant protection and management of coffee, cocoa, coconut, rubber, arecanut, betel vine etc.

Practical:

1. Identification of plantation crops.
2. Botanical description of plantation crops.
3. Propagation technique in plantation crops.
4. By products of plantation crops.
5. Visit to local plant nurseries.

M.Sc. (Ag.) III – Semester

Course Title: Vegetable Breeding

Course No.: HOR-510

Credit Hour – 3 (2+1)

Syllabus

History and scope of vegetable breeding, centre of origin and their role in crop improvement, germplasm introduction, conservation and exploitation, breeding system in vegetable crops, breeding methods in self and cross pollinated vegetables, heterosis and inbreeding depression, role of mutation and polyploidy in vegetable improvement, breeding for disease and insect pest resistance, breeding for tolerance to moisture, heat, cold and salt, breeding for quality. Use of biotechnology in vegetable crop improvement.

Practical:

1. Identification the hybrid varieties of vegetables.
2. List of the vegetable breeders and their fields.
3. Institute for germplasm conservation.
4. Identify the self, cross and often cross pollinate.
5. Visit to various institute related to vegetable breeding viz. IIVR, Biotech. Park, Lucknow etc.

M.Sc. (Ag.) IV – Semester

Course Title: Seed Production Technology of Vegetable Crops

Course No.: HOR-511

Credit Hour – 3 (2+1)

Syllabus

History, importance and scope of vegetable seed industry in India. methods of pollination, fertilization and seed development. Different categories of seed. Seed production in self pollinated, cross pollinated and asexually propagated vegetable crops, factors influencing seed production. Hybrid seed production and maintenance of inbreds. Seed harvesting, extracting and processing. Seed testing and seed certification, standards, intellectual property right and seed acts (National and International). Seed storage, seed born pests and disease, seed enhancement treatments. Economics of seed production.

Practical:

1. List out the vegetable seed industry in India.
2. Identify the different categories of the seed.
3. Seed production in self, cross asexually propagated vegetable crops.
4. Seed extraction in tomato and brinjal.
5. Seed testing.
6. Seed certification.
7. Identification of important seed born pest and disease and their control.
8. Economics of seed production.

M.Sc. (Ag.) IV – Semester

Course Title: Commercial Floriculture

Course No.: HOR-512

Credit Hour – 3 (2+1)

Syllabus

Improvement, cultivation and utilization of roses, jasmine, dahlia, marigold, chrysanthemum, carnation, canna, sweet pea, fern, orchids, cacti and succulents. Growing of important flower for exhibition. Dry flowers, Bonsai. Principles of flower arrangement, flower exhibition and judging. Flower forcing, principles and practices.

Practical:

1. Practices of wintering and pruning.
2. Preparation for seed bed for different flower crops.
3. Practices of different asexual propagation methods for flower crops.
4. Preparation of Bonsai.
5. Important points for cultivation of flower for exhibition.

RESEARCH METHODOLOGY

Paper-i

1. Meaning of research, objective of research, characteristics of research. Types of research- fundamental vs. applied. Research methods versus Methodology, Concept of researchable problem, selection of research problem, review of literature.
2. Hypothesis- meaning, characteristics, types of hypothesis, testing of hypothesis.
3. Methods of sampling- probability and non-probability sampling methods- criteria to choose.
4. Meaning of research design; need to research design; feature of a good design; basic principles of experimental design; different important research designs like CRD, RBD, LSD and split plot design.
5. Data collection- source of collection. Mailed questionnaire and interview schedule, structured, unstructured, open ended and closed-ended questions. Preparation of schedule, interviewing techniques and field problems- methods of conducting survey.
6. Processing and analysis of data- editing, coding, classification, tabulation, tools of analysis, interpretation of results, preparing research report/thesis, universal procedures for preparation of bibliography, writing of research articles.
7. *Basic knowledge of computer and its application:- introduction to computer and windows: Desktop computer, Input and output devices. MS WORD: Features, Creating, Saving and Opening a Document. MS-EXCEL: Worksheet basics, creating worksheet, entering into worksheet, heading information, data, text, dates, alphanumeric values, saving and quitting worksheet, working with formulae, Auto sum, Graphs and Charts. (*only for Practical)

Suggested Readings:

- Black, T.R. 1993. Evaluating Social Science Research- An introduction. SAGE Publ.
- Creswell, J.W. 1999. Research Design – Qualitative and Quantitative Approaches. SAGE Publ.
- Dhondyal, S.P. 1997. Research Methodology in Social Science and essential of thesis writing. Amman Publ. House, New Delhi.
- Kothari, C.R. Research Methodology- Methods and Techniques. Wishwa Prakashan, Chennai.
- Rao, K.V. 1993. Research Methodology- Commerce and Management. Sterling Publ. New Delhi.
- Singh, A.K. 1993. Tests, Measurements and Research Methods in Behavioural Sciences. Tata McGraw Hill.
- Venkatasubramanian, V. 1999. Introduction to Research Methodology in Agricultural and Biological Sciences. SAGE Publ.
- Godde & Hartt. Methods in Social Research.
- Young, P.V. Scientific Social Survey and Research.

Paper-ii

1. National and International scenario of horticultural crops viz., fruits, vegetables and flower crops production.
2. Major problems of horticultural crops and their remedies.
3. Nursery management of horticultural crops.
4. Modern concept of water and weed management.
5. Protected cultivation and precision farming of suitable horticultural crops.

Paper-iii

1. Export and import of horticultural commodity
2. Post harvest handling, storage, marketing and value addition of horticultural crops.
3. Refinement of production techniques of horticultural crops in relation to climate change.
4. Organic production of horticultural crops.
5. Abiotic stress management (drought, high and low temperature and salinity) in horticultural crops.
6. Study about Noni (*Morinda citrifolia* L.)

Suggested Reading for ii & iii

- Rao, K. Manibhushan. 1991. Textbook of Horticulture. Mc Millan India, Lucknow.
- Bose, T.K., Tropical and Subtropical fruits.
- Bose, T.K., Som, M.G. and Kabir, J. 1993. Vegetable crops, Naya Prakash, Calcutta.
- Shavmugavelu, K.G. 1989. Production technology of vegetable crops. Oxford and IBH and Pub. Co. Pvt., New Delhi.
- Singh, S.P. 1989. Production technology of vegetable crops, Universal Publ. Centre, Kernal.
- Randhawa, G.S. and Mukhopadhaya, A. 1986. Horticulture in India. Allied Publ. Ltd., New Delhi.
- Sharen, Postor Simson & Marta C. Straus. Management of Horticulture crop. Oxford Book Company.
- S.K. Bhattachargee, Aminity Horticulture Bio-Technology and Post Harvest Technology, Pointer publisher, Jaipur.
- G. Kalloo and Kirti Singh, Emerging Scenario in Vegetable Research and Development. Research Periodical and Book Publishing House.
- M.K. Sadhu and P.K. Chattopadhyay. Introductory fruit crops. Naya Prakash.
- Alex Laurie and Vietor. H. Res., Floriculture fundamentals and practices. Agrobios (India)
- P.K. Meena and J.S. Yadav., Horticulture Marketing and Post harvest management. Printer Publisher, Chennai, India.

