

# VBS Purvanchal University, Jaunpur

## Syllabus For M. Sc.(Ag) – Horticulture, First Year

1. Olericulture-----	100
2. floriculture and Ornamental Gardening-----	100
3. Spices, condiments, medicinal plants and plantation crops-----	100
4. Statistics-----	50
5. Practical-----	100
<b>6. Total-----</b>	<b>450</b>

### OLERICULTURE

1. Current status and future prospects of vegetable growing in India.
2. Aesthetic, economic and nutritive values of vegetables with special reference to phytochemicals and antioxidants.
3. Classification of vegetables and their relative merits and demerits.
4. Types of vegetable gardening.
5. Effect of temperature, photo-period light and relative humidity on vegetable production.
6. Role of plant nutrients and growth regulators in vegetable production.
7. Nursery techniques and hardening of seedlings.
8. Organic, chemical and bio-fertilizers and their response.
9. Irrigation and water requirement.

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10. Crop rotation, crop succession inter and mixed cropping, weed management, plant protection measures for vegetable production.
11. Harvesting marketing and disposed of vegetables, post harvest deterioration, storage and post harvest management in vegetable crops.
12. Processing and preservation of vegetables viz. canning freezing, dehydration, pickling and other modern methods.
13. Introduction origin, taxonomy and nutritive value, area distribution, production and productivity in India, climate and soil nursery techniques, methods of planting, improved varieties and hybrids, nutritional requirement, irrigation, interculture, weed management, plant protection, harvesting, disposal and economics of production of summer and winter season vegetables grown in India viz. tomato, chilli, eggplant, okra, beans, onion, kharif onion, celery, cauliflower, cabbage, knoll-khol, beetroot, radish, turnip, carrot, garden pea, garlic, palak, lettuce, cucurbits (cucumber, melons, squash, pumpkins, bottle gourd, ridge and sponge gourd, bitter gourd and ash gourd) leafy vegetables, cassava, sweet potato and yam.
14. Production of export quality of vegetables.
15. Productivity and potentiality of vegetable production of domestic market.

## **FLORICULTURE**

1. Importance and scope of floriculture, present status and its potential in the global market.
2. History and development of gardens.
3. Principles of gardening and different feature of gardens. Lawn, hedge, edge, flower beds, topiary, paths, steps, arches, pergolas and terrace etc.
4. Annuals and herbaceous border and shrubbery border.
5. Selection, multiplication cultivation and management of trees, shrubs, climbers, ferns, palms, bulbs orchids, cacti and succulents and other shade and moisture living plants.
6. Use of plant growth regulators in floriculture.

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7. Bonsai.
8. Flower show and floral arrangement, flower exhibition, staging and judging.
9. The history and development of different style of gardening and their characterisation.
10. Essential and accessories, designing and arrangement of formal gardens.
11. Principles practices, planning and elements of landscape gardening.
12. Cultivation & classification of important ornamental plants viz. roses, gladiolus, dahlia, tuberose, chrysanthemum, cannas, carnation, jasmines, marigold and anthurium.
13. Flower forcing and their principles and practices.
14. Civic aspects of ornamental horticulture, planning and arrangement of big parks, open space and city squares.
15. Aesthetic planning of the public building compounds and such other places.
16. Roads and planning of the boulevards of the cities.
17. Horticulture and town planning. Indoor gardening, indoor decoration, house plants and cut flowers.

## STATISTICS

1. Summarisation of data, frequency distribution and graphical representation of data.
2. Calculation of mean, median, mode and standard deviation, standard error.
3. Statistical significance. Practical application of simple test significance viz. 't' and 'F' test.
4. Principles and use of  $\chi^2$  (chi-square)-test.
5. Product moment, correlation and its test of significance.

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6. Principles of the design of experiment, paired comparisons planning and (RBD). Latin Square Design (LSD) and Split Plot Design.
7. Missing plot technique in Randomized Block Design and Latin Square Design, single plot missing.
8. Factorial experiment (without confounding) and confounding in  $2^3$  designs.
9. Progeny row trial and compact family block design.
10. Sire index, switch over trials, university trials and simple rotational experiment.
11. Statistics of area and crops, agency for collection in Uttar Pradesh.
12. Methods of collecting and compilation of primary data. Crop estimation and forecasting in U.P.
13. Normal yield and condition factor. Improvement of statistics of area and yield, random sample survey, crop cutting experiments
14. Statistics of live stock and fisheries. Census of live stock and agriculture in general, source of official statistics.
15. Linear regression, analysis of co-variance, elementary idea of probability.

## **SPICES, CONDIMENTS, MEDICINAL PLANT** **AND PLANTATION CROPS**

1. Introduction, origin, history, distribution, economic importance, crop improvement, climatic requirement, varieties, propagation and nursery management, cultural practices, nutritional and water requirement, plant protection and post harvest management of coffee, cocoa, coconut, rubber, clove, nutmeg, cinnamon, vanilla, coriander, mustard, ginger, turmeric, fenugreek, fennel, cumin, ajwaain, garlic and onion.
2. Introduction, history, present status and future prospects of the production of medicinal plants.

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3. Problems of production and marketing of medicinal plants.
4. Study of origin, distribution, species and varieties, climate and soil requirement, production techniques, disease, insect and pest management, processing and extraction of active ingredients in important medicinal plants such as aloe, ashwagandha, isabgol, kalmegh, rauwolfia, senna, dill, guggal, henbane, khasi kateri, liquorice, pipali, periwinkle and opium poppy.
5. Cultivation and utilization of Indian basil, kewada, mint, palmrosa grass, scented rose, vetibar, jasmynes, citronella dawana and muskdana.

## *Practical M. Sc.(Ag)-I*

### **A. Practical on paper-I**

1. Laying out of nurseries, raising of seedlings and hardening of seedlings.
2. Layout of nutrition and kitchen garden
3. Cropping schemes for commercial vegetable farms.
4. study and identification of important varieties and hybrids of vegetable crops.
5. Study and demonstration of application of plant growth regulators for seed treatment, fruit set and parthenocarpy.
6. Raising extraction grading and packing of seed of important vegetable crops.
7. Demonstration of preparation and application of chemicals for control of weed insect, pest and diseases.
8. Canning, dehydration and pickling of vegetables. Preparation of tomato ketchup, sauce and puree.
9. Growing of important vegetables in the field including harvesting and marketing. Study the economics of production and computation of cost-benefit ratio of different vegetable crops.
10. Selection and display of vegetables for exhibition and their judging.
11. Visit to vegetable farms.

### **B. Practical on paper-II**

1. Planning and layout of landscape and formal styles of gardens, bungalow compounds, public parks and public gardens.

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2. Multiplication of ornamental plants.
3. Preparation and maintenance of shrubbery and herbaceous borders. Preparation different bed designs.
4. Pruning and training of ornamental trees, shrubs and climbers.
5. Bonsai culture and flower arrangements, making of flower vase, bouquet, garden headdresses and buttonhole etc.
6. Making and maintenance of lawn, hedge, edge, rockery and topiary.
7. Growing of annual, perennials, bulbous, foliage, cacti and succulents and palms in beds as well as pots.
8. Practice and study of important cultural practices in roses, cannas, chrysanthemum and dahlia.
9. Intimate knowledge about important garden plants. Flowering trees, shrubs, hedges, edges, climbers, road side plants, annuals, succulents, ferns and shade loving plants.
10. Selection and growing of plants for exhibition, display and judging, preparation and presentation of herbarium.
11. Visit and tours to important ornamental gardens.

## C. Practical on paper-III

1. Identification of different aromatic, medicinal, spices, condiments and plantation crops.
2. Multiplication and cultivation in demonstration plots of above plants.
3. Production of essential oils and ingredients through distillation of important aromatic and medicinal plants.
4. Preparation of herbarium of these plants.

## Records of practical works

# Syllabus For M. Sc.(Ag)-Horticulture, Final Year

❖ Nursery Husbandry and orchard management-----	100
❖ Pomology-----	100
❖ Breeding and seed production of Horticultural Crops-----	100
❖ Thesis/Special paper -----	100
❖ Practical-----	100
❖ Thesis Viva voce or Practical on Special paper-----	50

## NURSERY HUSBANDRY, ORCHARD MANAGEMENT, PLANT PROPAGATION AND HORMONES

1. Introduction, basic concept and principles of plant propagation.
2. External and internal factors influencing seed germination.
3. Anatomical, physiological and biochemical basis of root induction, growth, callusing and formation of bud/graft union.
4. Stock and scion relationship.
5. plant growing structure and glass houses.
6. Role of plant growth regulators and hormones in horticultural crops.
7. Mist propagation and propagation through bottom head techniques.
8. High volume propagation system, phytopackaging and transportation of micro propagates.
9. Selection of site and layout of nursery, raising of nursery plants by seed and different vegetative methods.
10. Polyembryony and its importance in fruit growing.
11. Hardening of nursery plants.
12. Water and weed management of horticultural crops.
13. Selection, certification and maintenance of bud wood.
14. Propagation of horticultural crops through micropropagation method viz. tissue culture, meristem culture, embryogenesis, embrioculture and protoplast culture.
15. History, development classification and mechanism of action of different plant growth regulators.

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16. Role of growth regulators in propagation, weed control, flowering, fruit setting, fruit thinning, fruit drop, development of parthenocarpy, dormancy and storage of fruit crops.

## POMOLOGY

1. Importance and scope of fruit production .
2. Soil and climate in relation to fruit production.
3. Nutritional and water requirement, uptake, movement and influence on root distribution. Response of fruit plants to excess and deficiency of nutrients and moisture.
4. General survey of fruit grown in India with special reference to climate, chilling temperature requirement temperate fruits.
5. Pruning and training, growth and fruiting behavior of fruit plants.
6. Pollination, fruit set, fruit drop and fruit development.
7. Unfruitfulness, parthenocarpy and seedlessness of fruits.
8. Alternate bearing, use of growth regulators in fruit production.
9. Maturity indices, harvesting, grading, packing and marketing of fruits in India
10. principles under lying successful management of orchard . selection of site and location, planning ,layout and system of planting of orchard. Care and protection of young plant. Intercropping and cover cropping in fruit production.
11. High density orcharding.
12. Plant protection from pest ,disease and adverse condition.
13. Top working, frame working and rejuvenation of uneconomic orchard.
14. Origin, history, botany, classification, distribution, area and production, export potential, climate and soil requirement, varieties, root stock and methods of propagation, planting, nutrition, irrigation and weed management. flowering and fruiting, harvesting and disposal and control of disease and pest in mango, banana, papaya, pineapple, avocado, sapota, jackfruit, strawberry, walnut, citrus, guava, litchi, loquat, grape, apple, pear, plum, peach, cherry, almond. Brief study of underutilized (minor) fruits.
15. Processing, preservation and storage of fruits, changes during ripening and storage of fruits.



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## **BREEDING AND SEED PRODUCTION OF** **HORTICULTURAL CROPS**

1. Importance and scope of breeding in horticultural crops and history of crop improvement.
2. General principles of breeding centers of origin and their role in crop improvement.
3. Breeding system, incompatibility, apomixes, parthenocarpy, Polyembryony, sterility, dichogamy.
4. Method of crop improvement, introduction, clonal selection, hybridization, polyploidy breeding, mutation breeding, root stock breeding.
5. Heterosis breeding, recent trends and future strategies.
6. Vegetable germplasm collection, conservation and exploitation.
7. Breeding method of self and cross pollinated vegetables.
8. Breeding for disease and insect pest resistance, breeding tolerance to moisture, heat, cold and salt, breeding for quality.
9. Use of biotechnology in vegetable crop improvement.
10. Cytotaxonomy, varietal situations breeding properties and advances made in mango, grape, papaya, guava, pineapple, citrus, apple and peaches.
11. History importance and scope of vegetable seed industries in India.
12. Different categories of seed and their importance.
13. Pollination, fertilization and seed development.
14. Seed production of self pollinated, cross pollinated and sexually propagated vegetable crops.
15. Hybrid seed production.
16. Seed harvesting, extraction and processing, seed testing and seed certification, seed storage, seed standard, seed acts (national and international) and intellectual property rights.
17. Economic of seed production.

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## FRUIT TECHNOLOGY OR THESIS

- i. History, present status and future scope of fruit and vegetable industry in India.
- ii. General principles of fruit and vegetable preservation.
- iii. Microbiology of preserved foods.
- iv. Food spoilage such as microbial, enzymatic, mechanical damage and spoilage by insect pest and rodents.
- v. Importance and uses of enzymes, food colours, food additives, food flavours, pectin and plastics in fruit and vegetable preservation.
- vi. Raw materials and their quality characteristics for processing.
- vii. Establishment of preservation industry-site and location, planning and layout equipment management and maintenance.
- viii. Quality control during processing PFA, FPO, ISO, Codex etc.
- ix. Water for fruit and vegetable processing industry.
- x. Browning reaction and fermentation in foods.
- xi. Method of preservation and processing e.g. canning, freezing, dehydration, preserves, candied and crystallized fruits and vegetables, fermented and unfermented beverages, cordials, RTS, syrup, sharbats and squashes. Fruits juice and fruit juice concentrates. Jam, jelly and marmalades, sauces, puree and ketchup, vinegar, pickles and chutney and fruit butter.
- xii. Irradiation of fruits and vegetables and their future prospects.
- xiii. Methods of picking and storage of fresh and processed products.
- xiv. Laboratory examination including physical, chemical and organoleptic test of processed fruits and vegetables.
- xv. By products and utilization of fruits and vegetables waste.
- xvi. Manufacturing of pectin, papain, fruit toffee, fruit cheese and fruit leather etc.

### *Practical M. Sc.(Ag)-II*

#### **A. Practical on paper-I**

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1. Intimate practical knowledge of different methods of propagation of plants.
2. Study of different propagating structures.
3. Anatomical studies of rootage and graftage and study of root system of propagated plant by various methods.
4. Preparation of growth regulator solution and other available formulations used of plant growth regulator solutions in plant propagation, fruit set and fruit thinning, prevention of fruit drop, induction of parthenocarpy, fruit ripening and quality improvement.
5. Layout of nurseries, raising of plants, hardening and curing of rooted cuttings. Lifting, packing and marketing of nursery plants.
6. Preparation of media and mixtures for planting.
7. Demonstration of tissue culture including handling of micro-propagules.
8. Economics of propagated plants.
9. Visit to commercial nurseries.

## **B. Practical on paper-II**

1. Different system of planting fruits in orchards.
2. Layout and planting of orchards of various sizes.
3. Planning and arrangement of manuring, irrigation, pruning, training, after care and protection of young plants.
4. Control of insects, pest and diseases by different methods.
5. Harvesting, marketing, cost management of orchards and calculation of cost benefit ratio.
6. Study of physiological disorders of major fruits.
7. Survey of local fruit market to study, grading, packing and marketing of fruits.
8. Maturity indices of tropical, subtropical and temperate fruits.
9. Study of morphology of fruits.
10. Detection of sugars, TSS, acids and vitamins in fruits.
11. Selection and display of fruits for exhibition and their judging.
12. Visit to important fruit gardens.

## **C. Practical on paper-III**

1. Study of breeding habit, flower structure and pollen viability of different crops.
2. Emasculation and pollination practices in various horticultural crops.
3. Use of mutagens.
4. Testing of ornamental and vegetable seeds.
5. Seed extraction techniques of vegetables and ornamental plants.
6. Hybrid seed production, handling of hybrid seeds and raising of hybrid seedlings.

## **Records of practical works**