

Syllabus
M.Sc.(Ag.) Horticulture (Old)

Semester-I

Fundamentals of Bio-statistics and Computer Application (J-1004)

Unit – I

Processing of data: Introduction of Statistics, classification and tabulation of statistical data, frequency distribution, diagrammatical and graphical representation of data-bars, circles, rectangles, histogram, frequency polygon, frequency curve and cumulative frequency curves.

Unit – II

Measures and Central Tendency and Dispersion: Mean, median, mode, quartile and calculation of median, mode and quartiles by graphs, range, quartile deviation, mean deviation, standard deviation, variance, coefficient of variation and standard error of mean.

Unit – III

Probability and Distribution: Random experiment, events-exhaustive, mutually exclusive, equally likely, independent and favourable, definition of probability, (with simple exercise), law of addition and law of multiplication of probability (with simple exercise), random variable-discrete and continuous, definitions of Binomial, Poisson and Normal distributions and simple properties of the above distributions (without derivation).

Unit – IV

Correlation and Regression: Bivariate data, bivariate frequency distribution, simple correlation, Karl Pearson's correlation, rank correlation, Spearman's rank correlation coefficient, linear regression, regression lines, regression coefficients and their relation with correlation coefficient, multiple regression, multiple and partial correlation coefficients (for three variable only).

Unit – V

Computer Application:

Introduction of computer: Definition, History, generation of development, characteristics of computers, benefits and application of computers.

Organisation of Computer Hardware: Input devices, output devices, CPU, storage unit, Software: Types of software, application of software, system software, utility software, general purpose software. Binary number system and its conversion, Introduction to statistical packages (Excel, SPSS, SYSTAT, Sigma stat).

Fundamentals of Vegetable Production (J-1061)

Unit – I

Importance, present position and future scope of olericulture in India. Food value of vegetables. Type of vegetable growing. Classification of vegetables.

Unit – II

Soil and climatic requirement of vegetables (Chilling requirement and heat unit). Irrigation

and drainage management. Nutrient and fertilizer management.

Unit–III

Nursery management in vegetable growing. Intercultural operations (hoeing, weeding, staking, earthing-up, inter cropping and mixed cropping)

Unit–IV

Role of plant growth regulators (PGR) in vegetable growing. Use of plastics in vegetable cultivation. Protected cultivation of vegetable crops.

Unit –V

Integrated Pest and Disease management. Integrated Nutrient management (INM). Hydroponics and Aerobics.

Propagation & Nursery Management (J-1062)

Unit-I

Need for plant multiplication. Sexual and asexual method of propagation, their advantages. Seed morphology, anatomy, maturity, seed dormancy, factors affecting dormancy and methods to overcome them. Apomixes – monoembryony, polyembryony.

Unit-II

Methods and techniques of cutting, layering, grafting, and budding, Factors affecting rooting of cuttings and layering. Anatomical studies of bud union. Stomatal effects and their influences.

Unit-III

Establishing of horticultural nursery. Selection and maintenance of mother plants, collection of scion wood, rootstock. Lifting and packing of seedling from nursery. Nursery tools and implements.

Unit-IV

Propagation structures (glasshouse, polyhouse, mist chamber, cold frames, hot beds, lath house, humidifier etc.) Role of polythene in propagation.

Unit-V

Use of plant growth regulators (PGR) in sexual and asexual propagation. Disease and insect pest management of nursery plants. Micro-propagation.

Fundamentals of Ornamental Gardening (J-1063)

Unit-I

History, importance, present position and scope of landscape gardening. India Principles of garden designs – initial approach, axis, focal point, mass effect, unity, space, divisional lines, proportion and scale, texture, mobility, light, tone and colour.

Unit-II

Style of gardening (formal garden, informal garden, Wild garden) with special reference of

Mughal garden, Japanese garden, Persian garden, French garden, Italian garden, English. Garden features

: pavements and steps, fences and gates, hedges and edges, arch, pergola, screens and borders, lawn, flowerbeds, shrubberies, rosery, rockery, water body and bridges. Garden adornments - stonelanterns and basins, statues, towers, sundial, topiary, bird bath, saddle stones and floral clock.

Unit-III

Specialized gardens: Indoor gardening, pots and containers, potting mixtures. Water garden, rock garden, roof garden, vertical garden, marsh or bog garden, stunk garden, gardening in the shade. Landscaping of highways, railways station and railway lines, along bank of rivers and canals, city, town and country-sides, public buildings, educational institutions, factories, places of historic importance, places of worship, small home ground, crematories and burning ghats.

Unit-IV

Flowering annuals – classification, colour scheme and grouping (monochromatic, analogous, complementary or contrasting).

Ornamental trees – ecological adaptation, plantation, and after care of trees. Ornamental shrubs – morphological characters and cultural practices.

Ornamental climbers – description of ornamental climbers and their planting. Cacti and succulents, palm and cycads, ornamental grasses, bonsai.

Unit-V

Garden practices: plantings and transplanting, stopping and pinching, deshooting and disbudding, defoliation, staking, pricking, shading, training and pruning, wintering, clipping or culling of hedges and edges, mulching. Floral ornaments and flower arrangement.

Semester-II

Statistical Methods in Agriculture (J-2004)

Unit – I

Theory of Sampling: Concept of sampling, sampling Vs complete enumeration, simple random sampling, stratified sampling, systematic sampling, cluster sampling and multistage sampling (methods, advantages and disadvantages only)

Unit – II

Testing of Hypothesis: Null and alternative hypothesis, two types of error, level of significance, power of the test, one tailed and two tailed tests.

Unit – III

Test of significance: Z and t-test for testing quality of two means, chi-square test for testing goodness of fit, independence of attributes (contingency table) with Yates correlation and testing for the variance of population, F-test for testing the quality of two variance and homogeneity of means (analysis of variance)

Unit – IV

Analysis of Variance: Analysis of variance with one way and two way classification (one observation per cell).

Unit – V

Design of Experiments: Basic principles of design of experiments, uniformity traits, shape and size of the plots and blocks, completely randomized, randomized block and Latin square designs and their analysis, missing plot technique in R.B.D., simple factorial experiments of the 2^2 and 2^3 , confounding in factorial experiments, split-plot experiments (Layout only).

Production Technology of Vegetable-Crops and Spices (J-2061)

Improved production technology of vegetable crops with special reference to origin and distribution, soil and climate, land preparation, improved varieties, sowing and planting, irrigation, fertigation, intercultural operations, training, pruning and staking, harvesting, major insect-pest and disease control measures, storage and marketing.

Unit-I

Solanaceous fruit vegetables – tomato, brinjal, chilli and capsicum, and potato and okra.

Unit –II

Cole crops – cauliflower, cabbage, knolkhol and broccoli, and Root crops – radish, carrot, beet root and turnip.

Unit-III

Peas and beans – pea, French bean, cowpea, broadbean. Green Leafy vegetables – spinach, palak, amaranth, and Bulb crops – onion and garlic

Unit-IV

Cucurbits – cucumber, muskmelon, watermelon, bottle gourd, bitter melon, pumpkin and squashes, sponge gourd, ridge gourd, and
Tuber crops – colocasia (arvi and banda), elephant foot yam, sweet potato, cassava.

Unit –V

Spices – cumin, coriander, fenugreek, fennel, ginger, turmeric etc. Important physiological disorders of vegetable crops.

Orchard Management (J-2062)

Unit-I

Establishing of orchard – selection of site, planning, selection, and procurement of quality planting material, soil preparation, layout, planting systems, digging of pits, planting, after care of young plants.

Unit-II

Irrigation management of fruit trees; water requirement and method and time of application. Abnormalities caused due to excess and deficiency of moisture. Manurial requirement of fruit trees, major and minor nutrients, nutrient deficiency and their remedies, foliar feeding.

Unit-III

Growing and fruiting habits of fruit trees . Training and pruning in fruit trees.Clean cultivation , sodculture, intercropping,covercrops, fillercrop.

Unit-IV

Pollination and pollinizers . Unfruitfulness, factors affecting and remedial measures.Alternatebearing, factorsaffectingandremedialmeasures.Fruitthinning, fruitdropandfruit splitting

Unit-V

Rejuvenation of old and uneconomic orchards . Protection from insect- pest and diseases Highdensity plantingsystem inorchards.Drylandfarminginfruit crops

Production Technology of Ornamental Crops (J-2063)

Production technology of flower crops with special reference to origin, history and distribution, soiland climate, land preparation, training, pruning and staking, harvesting/picking, major insect pestanddisease controlmeasures, storage andmarketing.

Unit-I

Rose, carnation, chrysanthemum and dahalia.

Unit-II

Gladiolus, tuberose, lilies, tulip and alstromeria.

Unit-III

Marigold, gerbera, aster , orchids and jasmine.

Unit-IV

Cultivationofcutflowercrops,cultivationoflooseflowercrops,cultivationofcutfoliage/cutgreen s

Unit-V

Greenhouse cultivationofimportantflowerandornamentalcrops

Semester-III

Fundamental of fruit Production (J-3061)

Unit-I

Importance , present position and future Scope of fruit culture in India . Classification of fruit crops.

Unit-II

Flowering and fruiting of fruit crops: Inflorescence , forms of flower , blooming period, pollination and pollinizers , bearing habit , habit , type of fruits, etc.

Unit-III

Soil and climatic requirements of fruit crops . Irrigation requirements of fruit crops. Irrigation requirements of fruit crops: irrigation methods time and amount of water application . Nutritional requirements of fruit: deficiency symptoms, fertilizer dose, method and time of application.

Unit-IV

Insect- pest management in fruit crops . Disease management in fruit crops .

Unit-V

Marketing of fruit crops in India. Import and export of fruits and their products . Use of plant growth regulators (PGR) in fruit setting, fruit thinning, fruit drop, parthenocarpy, yield and quality of fruits.

Breeding of Vegetables and Ornamental crops (J-3062)

Unit-I

History of vegetable and ornamental Breeding research and infrastructure in India . Centre of origin and genetic variability of vegetable crops . Mendel's laws of inheritance . Qualitative and quantitative inheritance . Self incompatibility , male sterility. Heterosis and inbreeding depression . Mutation breeding . Hybridization techniques. Polyploidy in crop improvement. Bio technology and genetic engineering.

Unit-II

Self pollinated vegetable crops : mechanism of self pollination. Breeding procedures and techniques of self pollinated vegetable crops.

Unit-III

Cross pollinated vegetable crops, mechanism of cross pollination . Genetic composition of cross pollinated populations. Selection in cross pollinated populations, Hardy Weinberg Law. Breeding procedures and techniques of cross pollinated vegetable crops. Hybrid and synthetic varieties.

Unit-IV

Breeding of major vegetable crops: tomato , brinjal, chilli, and capsicum, cauliflower, cabbage, onion, radish , carrot, pea, French bean, cucumber, muskmelon, watermelon, bottle gourd, bitter melon, pumpkin, and squashes, pointed gourd, okra, potato, colocasia, elephant, foot Yam etc.

Unit-V

Breeding of important flower crops: Rose , carnation, chrysanthemum, gladiolus, marigold , gerbera, aster, orchids, lilies, tulip, jasmine, dahalia, alstromeria.

Fundamentals of Preservation of Horticultural Crops (J-3063)

Unit-I

History, importance, present position, and scope of preservation. General principles of fruit and vegetable preservation.

Unit-II

Enzymatic and textural changes, respiration, and transpiration of fruits and vegetables. Spoilage in fruit and vegetable preservation unit. Equipments for home and commercial production.

Unit-IV

Methods of preservation. Preservation by drying and dehydration. Preservation by Freezing. Preservation with sugar and chemicals. Preservation with salt and vinegar.

Unit-V

Fermentation. Browning reaction. Food colour. Food flavour. Enzymes and other microorganisms in preservation of fruits and vegetables.

Postharvest technology of Horticultural Crops (J-3064)

Unit-I

Importance of post harvest management in fruits, vegetables and ornamental crops. Component of quality, variability due to genetic environmental and cultural factors, Stage and time of harvesting, water quality and relation. Pre and post harvest factors related to post harvest deterioration of horticultural crops. Physiological and biological changes during and after maturity in horticultural crops. Postharvest losses.

Unit-II

Maturity indices. Hardening and delaying ripening process in fruit crops. Time and method of Harvesting. Pre and post harvest treatment of horticultural crops. Methods of storage. Type of Storage. Precooling. Control and modified atmospheric storage, low pressure storage. Grading, packing and transportation of horticultural crops.

Unit-III

Post harvest management of important fruit crops; Mango, Banana, Papaya, Guava, Litchi, Grapes, Apple etc.

Unit-IV

Post harvest management of important vegetable crops; Solonaceous fruit vegetables, cole crops, peas and beans, root and bulb crops, tuber crops, green leafy vegetables, cucurbits, okra, potato etc.

Unit-V

Factors affecting bud and flower development, sensation, carbohydrate and nitrogen metabolism. Role of applied sugars, growth regulators, metallic salt and other chemicals on delaying quality deterioration. Special features like bent neck, flower bud abscission, geotropic

bending, foliage discoloration, pulsing, bud opening and folding solution etc. Post harvest management of rose, carnation, chrysanthemum, jembera, gladiolus, orchids, tulip, lilies etc.

Semester-IV

Production of fruits Crops (J-4061)

Unit-I

Improved production technology of fruit crops with special reference to origin, history and distribution, soil and climate, land preparation, improved varieties, sowing and planting, irrigation, fertigation, inter cultural operation, training, pruning and staking, harvesting/ picking, major insect pest and disease control measures. Storage and marketing, Tropical fruits: Mango, guava, papaya, banana, jack fruit, pineapple, sapota, arecanut,

Unit-II

Subtropical fruits: citrus, litchi, loquat, false pomegranate, aonla, bael, ber and grapes.

Unit-III

Temperate fruits: Apple, peach, pear, plum, almond and apricot and other fruits of minor importance.

Unit-IV

Study of important physiological disorders of fruit crops: Aonla necrosis, bitter pit of apple, yellow spot, granulation of citrus, shot berry, pink berry, hen and chickens of grapes, fruit cracking of pomegranate and litchi, multiple crown of pineapple, black tip, tapper tip, tippulp, grid necrosis, sunburn, jelly seed, soft nose, stem end drought, internal fruit necrosis of mango.

Unit-V

Major problems of fruit growing- mango malformation, alternate bearing, sponge tissue in mango, bunchy top of banana, guava wilt, citrus canker, root built of coco nut, yellow leaf disease of arecanut etc.

Breeding of Fruit Crops (J-4062)

Unit-I

History and infrastructure of fruit breeding in India. Centre of origin of fruit crops, objective of fruit breeding.

Unit-II

Breeding of major fruit crops with special reference to origin and distribution, genetic diversity, germplasm resource, wild species, botany, floral biology, pollination, inheritance pattern, pre selection criteria, breeding objectives, breeding methods and achievements, improved varieties and future research thrust.

Tropical fruits: Mango, guava, papaya, banana, jack fruit, pineapple, sapota, arecanut,

Unit-III

Subtropical fruits: citrus, litchi, loquat, falsa, pomegranate, aonla, bael, ber and grapes.

Unit-IV

Temperate fruits: Apple, peach, pear, plum, almond and apricot.

Unit-V

Breeding of abiotic stress (Salt tolerance, Moisture stress, High and low temperature). Breeding for insect-pest and disease resistance.

Processing of Fruits and Vegetables (J-4063)

Unit-I

Treatment prior to processing the fruits and vegetables. Drying and dehydration of fruits and vegetables, smoking and sulphuring, freezing of fruits and vegetables, freezing units, cold storage etc.

Unit-II

Preservation with sugar-candy, preserve, crystallised fruit. Preservation with sugar acid and chemicals- Jam, jelly, marmalade.

Unit-III

Preservation with salt and vinegar- Pickles, Chutni, Sauce/ketchup. Brine solution and brining.

Unit-IV

Unfermented and fermented fruit beverage, ready to serve (RTC) drinks, some other products from fruits and vegetables (Mushroom processing etc.).

Unit-V

Quality control of processed products-FPO and AGMARK specialization, government policy on import and export of processed fruit and food law. Chemical preservatives, Vinegar. Importance of byproducts from processing plants. Food poisoning and their control measure.

Seed production Technology of Vegetables and Flowers (J-4064)

Unit-I

History, Importance, present position and future scope of vegetable and flower seed production in India. Seed morphology and anatomy and type.

Unit-II

Seed production technique of major vegetable crop. Solonaceous fruit vegetables- Tomato, brinjal, chilli, and capsicum. Cole crops - Cauliflowers, cabbage, knolkhol and broccoli. Root Crop-

Carrot, Raddish, Beet root and turnip. Peas and beans- pea, French bean, Cow pea, Cucurbits- Cucumber, Musk melon, Water melon, bottle gourd. Bitter gourd, Pumpkin, and Squashes, spongegourd, ridgegord, onion, okra, spinach.

Unit-III

Seed [production techniques of important flower crops- Rose, carnation, chrysanthemum, gladiolus, marigold; dahalia, jerbera, aster, orchids, lilies, tulip, jasmine, dahlia, alstromia etc.

Unit-IV

Land / Field standards in seed productions. Seed standards and evaluation, seed testing, seed processing. Seed packing and storage. Seed certification, Seed production, and Certification. agencies.

Unit-V

Indian seed industry. Quality control of vegetable and flower seeds. Seed policy. Quarantine.