**DEPARTMENT OF HORTICULTURE**

Syllabus, credit and mark distribution of M.Sc. (Ag.) Horticulture Course

**VEER BAHADUR SINGH PURVANCHAL UNIVERSITY, JAUNPUR-222 003**

**List of Credit Courses to Implemented in M.Sc. (Ag.) Horticulture Programme**

at

Veer Bahadur Singh Purvanchal University, Jaunpur

**Ist Semester**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Code No.** | **Course Title** | **Credit Hours** | **Theory** | **Practical** | **Total** |
| **Mid**  | **Final** |
| HORT-501 | Fundamental of Fruit Production | 3(2+1) | 30 | 50 | 20 | 100 |
| HORT-502 | Fundamentals of Vegetable Production | 3(2+1) | 30 | 50 | 20 | 100 |
| HORT-503 | Nursery Husbandry and Plant Propagation | 2(1+1) | 30 | 50 | 20 | 100 |
| STAT-551 | Statistical methods | 3(3+0) | 50 | 50 | 00 | 100 |
|  | **Total Credit**  | **11** |  |  |  |  |

**IInd Semester**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Code No.** | **Course Title** | **Credit Hours** | **Theory** | **Practical** | **Total** |
| **Mid**  | **Final** |
| HORT-504 | Production Technology of Fruit Crops | 3(2+1) | 30 | 50 | 20 | 100 |
| HORT-505 | Production Technology of Vegetable Crops | 3(2+1) | 30 | 50 | 20 | 100 |
| HORT-506 | Landscaping & Ornamental Gardening | 3(2+1) | 30 | 50 | 20 | 100 |
| STAT-552 | Experimental Designs | 2(2+0) | 50 | 50 | 00 | 100 |
|  | **Total Credit**  | **11** |  |  |  |  |

**IIIrd Semester**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Code No.** | **Course Title** | **Credit Hours** | **Theory** | **Practical** | **Total** |
| **Mid**  | **Final** |
| HORT-507 | Commercial Floriculture | 3(2+1) | 30 | 50 | 20 | 100 |
| HORT-508 | Production Technology of Medicinal, Aromatic, Spices and Plantation Crops | 3(2+1) | 30 | 50 | 20 | 100 |
| HORT-509 | Breeding of Horticultural Crops | 3(2+1) | 30 | 50 | 20 | 100 |
|  | **Total Credit**  | **09** |  |  |  |  |

**IVth Semester**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Code No.** | **Course Title** | **Credit Hours** | **Theory** | **Practical** | **Total** |
| **Mid**  | **Final** |
| HORT-510 | Principle of Fruit and Vegetable Preservation | 3(2+1) | 30 | 50 | 20 | 100 |
| HORT-591 | Seminar | 1 |  |  |  | 100 |
| HORT-599 | Thesis/Research Work | 20 | 50 | 30 | 20 | 100 |
|  | **Total Credit**  | **24** |  |  |  |  |
|  | **Total Credit Hours** | **55** |  |  |  |  |

**M.Sc. (Ag.) Ist – SEMESTER**

**Course Title: Fundamentals of Fruit Production**

**Code No.: HORT-501 Credit Hour -3 (2+1)**

**Syllabus**

Importance and scope of fruit production, importance of fruit in human nutrition. Classification of fruit crops. Factors affecting fruit production. Nutrition of fruit crops. Water and weed management in fruit production. 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- Methods of training and pruning in fruit plants.

3- Irrigation system followed in orchard

4- Fertilizer application in fruit crops including fertigation.

5- Visit of local commercial orchard.

6- Fruit behavior of fruit plant.

7- Use of growth regulators.

**M.Sc. (Ag.) Ist – SEMESTER**

**Course Title: Fundamentals of Vegetable Production**

**Code No.: HORT-502 Credit Hour – 3 (2+1)**

**Syllabus**

Importance of vegetable in human nutrition. Area, production, productivity and potentiality of vegetable production. Type of vegetable gardening. Classification of vegetable crop, factors influencing vegetable production. Role of plant 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. Harvesting, 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. Classification of vegetable crops.

5. Raising of vegetable nurseries.

6. Preparation of cropping scheme for commercial farm and kitchen garden

7. Visit of commercial greenhouse/poly house.

**M.Sc. (Ag.) Ist – SEMESTER**

**Course Title: Nursery Husbandry and Plant Propagation**

**Code No.: HORT-503 Credit Hour – 2 (1+1)**

**Syllabus**

Selection of site and nursery layout. Dormancy of seed and physiology of seed germination. Selection, certification and maintenance of mother plants and bud wood. Plant growing structure glass house, mist chamber etc. Polyembryony and its importance. Root stock and stionic effect in fruit crops. Basic concept and principles of plant propagation. Budding, grafting, cutting and layering in fruit plants. Anatomy and physiology of root formation and graft union.

**Practical:**

1. Prepare layout of nursery for ornamental plants, vegetables, fruits and forest trees.

2. Root stocks used in fruit crops.

3. Propagation by cutting.

4. Propagation by layering.

5. Propagation by budding and grafting.

6. Study of various plant growth structures.

7. Visit to commercial green house.

**M.Sc. (Ag.) IInd SEMESTER**

**Course Title: Production Technology of Fruit Crops**

**Code No.: HORT-504 Credit Hour – 3 (2+1)**

**Syllabus**

Origin history and distribution, botany, varieties, soil and climatic requirements. Root stocks, propagation, planting, training and pruning, manuring, irrigation and weed control, flowering and fruiting, harvesting, pest and diseases and their control in mango, banana, papaya, pineapple, sapota, cashewnut, citrus, grapes, guava, fig, jamun, karonda, litchi, loquat, jackfruit, aonla, pomegranate, phalsa, apple, pear, peach, plum, apricot, walnut.

**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. Visit to tropical, sub tropical and temperate orchards.

**M.Sc. (Ag.) IInd SEMESTER**

**Course Title: Production Technology of Vegetable Crops**

**Code No.: HORT-505 Credit Hour – 3 (2+1)**

**Syllabus**

Introduction, origin and history, distribution, area and production, improved varieties, climate and soil requirement, nursery techniques, sowing/planting, nutritional requirement, irrigation, intercultural, weed control, plant protection, harvesting, grading, packaging and storage of important vegetable crops such as cabbage, cauliflower, knol-khol, beet root, radish, turnip, carrot, garden pea, onion, garlic, palak and lettuce, brinjal, hot and sweet peper, tomato, beans, cowpea, cucurbitaceous crops, leafy vegetables and sweet potato.

**Practical:**

1. Planning of layout of kitchen garden.

2. Identification of important vegetable seeds and plants.

3. Raising of vegetable nursery.

4. Study of physiological disorders and deficiency of mineral elements.

5. Identification of important pests and diseases and their control.

**M.Sc. (Ag.) IInd SEMESTER**

**Course Title: Landscaping and Ornamental Gardening**

**Code No.: HORT-506 Credit Hour – 3 (2+1)**

**Syllabus**

Importance and scope of landscape gardening, history and development of garden, principles of gardening, element of design, different type and style of gardening, different components (features) of a garden such as garden wall, garden drive, paths, steps, hedge and edge plants, topiary, arches, pergolas, terrace gardening, paves garden, carpet bedding, flower bed, annuals, herbaceous border, shrubbery borders, avenue trees, rock garden and green house conservatory. Selection, multiplication cultivation and management of trees, shrubs and climbers. Civic aspect of ornamental gardening, planning and arrangement of parks.

**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.) IIIrd SEMESTER**

**Course Title: Commercial Floriculture**

**Code No.: HORT-507 Credit Hour – 3 (2+1)**

**Syllabus**

Cultivation, improvement and utilization of roses, jasmine, dahlia, marigold, chrysanthemum, gladiolus, tuberose, carnation, sweet pea, anthurium, fern, palm, orchids, cacti and succulents. Growing of important flower for exhibition. Dry flowers, Bonsai. Principles of flower show and flower arrangement, flower exhibition and judging. Flower forcing and their 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.

**M.Sc. (Ag.) IIIrd SEMESTER**

**Course Title: Production Technology of Medicinal, Aromatic, Spices and Plantation Crops**

**Code No.: HORT-508 Credit Hour – 3 (2+1)**

**Syllabus**

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 ashwagandha, sarpgandha, isabgoal, kalmegh, senna, safed musali, basil, kewada, mint, vitiver, palmarosa, lemon grass, scented rose, jasmine, clove, nutmeg, turmeric, coriander, ginger, fennel, cardamom, coffee, cocoa, coconut, rubber, arecanut, betel vine etc.

**Practical:**

1. Identification and botanical description of medicinal, aromatic, spices and plantation crops.

2. Propagation technique in medicinal, aromatic, spices and plantation crops.

3. Production of essential oil and ingredient through distillation of important medicinal and aromatic plant.

4. Preparation of herbarium of these plants.

**M.Sc. (Ag.) IIIrd SEMESTER**

**Course Title: Breeding of Horticultural Crops**

**Code No.: HORT-509 Credit Hour – 3 (2+1)**

**Syllabus**

Importance and scope of breeding in horticultural crops and history of crop improvement. General principle of breeding centre of origin and their role in crop improvement. Breeding system, incompatibility, apomixes, parthenocarpy, polyembryony, sterility and dichogamy. Method of crop improvement, introduction, clonal selection, hybridization, polyploidy breeding, mutation breeding. Heterosis breeding, recent trends and future strategies. Vegetable germplasm collection, conservation and exploitation. Breeding method of self and cross pollinated vegetables. Resistance breeding for biotic and abiotic stress, quality improvement. Varietal situations, breeding properties and advances made in mango, grape, papaya, guava, citrus, apple and peaches and important vegetable crops.

**Practical:**

1. Identification the hybrid varieties.

2. List of the horticultural crop breeders and their fields.

3. List of the Institute related to horticulture breeding and germplam conservation.

4. Emasculation and pollination practices in important horticultural crops.

5. Visit to various institute related to horticultural breeding.

**M.Sc. (Ag.) IVth – SEMESTER**

**Course Title: Principle of Fruit and Vegetable Preservation**

**Code No.: HORT-510 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 eg. Canning, freezing, dehydration, preserves, cordial, sauce, puree, squash, jam, jelly, marmalades, pickles and various vegetable products. Methods of storing of fresh and preserved products. Quality control during processing. Fruit products order. 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. Preparation of beverages (cordial, squash etc.).

3. Preparation of pectin products (jam, jelly, marmalades).

4. Preparation of preserves.

5. Preparation of tomato products (sauce, chutney, puree etc.).

6. Visit to fruit and vegetable processing unit.

7. Preservation by drying and dehydration.

**Note:**

 **Syllabus of STAT-551 and 552 shall be common for P.G Classes**

**M.Sc. (Ag.) Ist- SEMESTER**

**Course Title- Statistical Methods**

**Code No.:- STAT-551 Credit Hour- 3 (3+0)**

UNIT I

Summarization of data, classification and tabulation of data, Diagrammatic and Graphical Representations, utility and limitations of graphical Representation. Measure of central tendency, definition, merit, demerit, uses and properties of different measure of central tendency, measure of dispersion, moments, skewness and kurtosis.

UNIT II

Probability distribution, discrete probability distribution- Bernouli, poission, normal distribution. Theorem of addition of probability, theorem of multiplication of probability, Definition- (simple and compound events independent and dependents, mutually exclusive, complimentary events.)

UNIT III

Statistical Hypothesis, Null hypothesis, Two type of error, Stpatistical significance, parametric and nonparametric hypothesis, critical region, level of significance, practical application of simple test of significance viz, ‘t’ and ‘F’ test. X2 test as a goodness of Fit, properties of X2 distribution, conditions for application of X2 test.

UNIT IV

Correlation and its test of significance, line of regression and its test of significance. Correlation, measurement of correlation, limit and range of correlation coefficient expressed in term of regression coefficients. Rank correlation and its computations, regression equation.

**M.Sc. (Ag.) IInd- SEMESTER**

**Course Title- Experimental Designs**

**Code No.:- STAT-552 Credit Hour- 2 (2+0)**

UNIT I

Principles of experimental design, precision and accuracy, advantage of replication, experimental technique. Analysis of variance, fundamental principles of analysis of variance. Critical difference, limitations of the analysis of variance.

UNIT II

Statistical analysis and advantage and disadvantage of basic design-completely randomized design, randomized block design, Latin square design.

UNIT III

Factorial concept: simple effects, main effects and interaction, factorial experiments (without confounding), Yates method. Confounding, principles of confounding in a 23 factorial experiments. Split plot design.

UNIT IV

Missing plot technique; Bartlett’s techniques for missing plots, cross-overdesign or switch-over trials, Rotational experiments, progeny selection, compact family block design, uniformity trial, sire index, sampling in field experiments.