M.J.P. ROHILKHAND UNIVERSITY, BAREILLY

COURSE STRUCTURE FOR

M.Sc.(Ag.) Horticulture

Under Annual System to come into

force from Academic Session 2015-16

.

FACULTY OF AGRICULTURE

M.J.P. ROHILKHAND UNIVERSITY, BAREILLY

ORDINANCES

M.Sc. (Ag.)

(PREVIOUS AND FINAL EXAMINATION)

There shall be two examinations, one at the end of each year, the first being the M.Sc.(Ag.) Previous examination and the second M.Sc.(Ag.) Final examination. The maks of bith the exminations. (Previous & Final) obtained in aggregate in Theory and Practical will count together for a place on the pass list of the Final examination. Division will be assigned as under on the total assigned as under on the total aggregate marks obtained at the both the examinations (Previous and Final) counted together.

First Division 60% of the total aggretate marks in

Second Division 48% of the theory and practical separately.

All the rest in Third division, if they obtained the minimum pass marks of 36% in aggregate.

A candidate is required to pass in written and the practical examination separately.

Candidates must submit their thesis to the Registrar well in time. The thesis shall be examined by a Board of two examiners one external and the other internal i.e. the teacher concerned. Each examiner shall award marks as follows :

Thesis (100 marks) , out of 50 marks

Viva (50 marks), out of 25 marks

Their marks will be totaled to determine the candidates's marks out of 150.

M.Sc.(Ag.) Horticulture

(Previous Year Examination) Total Marks- 350

Theory

Paper No.	Subject Code	Title of paper	M.M.
Paper I	HOR1501	Advances in Pomology	100
Paper II	HOR1502	Advances in Post Harvest Technology and Managements of fruits & vegetable	100
Paper III	HOR1503	Statistical methods & experimental design	50

Practical

	HOR1504 (Previous)		100
		Total	**350**

M.Sc.(Ag.) Horticulture

(Final Year Examination) Total Marks- 450

Theory

Paper No.	Subject Code	Title of paper	M.M.
Paper I	HOR1505	Production Technology of vegetable & spices	100
Paper II	HOR1506	Advances in Floriculture & landscaping	100
Paper III (Special paper)	HOR1507	Advances in Medicinal & Aromatic and Plantation crops	100
		OR	
THESIS	HOR1508	Research work on Horticultural crops	100

Practical

	HOR1509 (Final)		100
	HOR1510	Either Practical on Paper III	50
		OR	
	HOR1511	Viva-voce on Thesis	50
		Total	**450**

GRAND TOTAL (Previous & Final) **800**

M.Sc.(Ag.) Horticulture (Previous year)

Subject Code : **HOR1501** **M.M. 100**

Paper - I : (Advances in Pomology)

Unit I : Plant propagationa nd nursery management for fruit crops, sexual and asexual methods of propagation, seed germination, seed dormancy, apomixis, polyembryony, stionic effect, micropropagation, embryogenesis, micrografting, tissue culture, protoplast culture, somatic hybrid, cybrid, artificial seeds, cryopreservation, achievements of biotechnology in horticultural crops. Role of growth regulators in horticultural crops.

Unit - II: Orchard Management : Establishment of Orchand, selection and planning of site, layout of orchard, planting system, high density orcharding water requirement, foliar feeding, sprinkler and drip irrigation, fertigation, Nutrient requirements organic cultivation, Bio-fertilizers, INM, Dryland farming in fruit crops. canopy management in fruit crops. Training and Prunning, Fruit drop, Fruit splitting. alternate bearing, Unfruitfulness, Integrated Pest Management.

Unit- III: Production technology of Fruit Crops : Improved Production Technology of Fruit science and scope of fruit industry in India. Origin and distribution, area and production, taxonomy, important cultivars, nutritions, bearing habit, pollination and fruit set, use of bio-regulators , special problem, disease and insect pest management, maturity indices, harvesting , grading, packing, storage and ripening techniques, industrial and export potential, Agri Export Zone (AEZ) of the following fruit crops :

(a) Tropical fruits : Mango, banana, Papaya, Guava, Sapota, Jackfruit, Pineapple.

(b) Subtropical fruits : Citrus, litchi, loquat, Jamun, Phalsa, Pomegranate, Aonla,Ber,Bael & grapes.

(c) Temperate fruits: Apple, Pear, Plum, Peach, alond, Apricot, Straberry.

Unit- IV: Breeding of Fruit crops : Center of origin, distribution, breeding objectives, approaches for crop improvement- introduction, selection, hybridization, mutation breeding, polyploid breeding, biotechnological interventions , achievements and future trust in the following seleted fruit crops: Mango, Banana, citrus , grapes, guava, papaya, litchi, apple, pear, peach, plum.

M.Sc.(Ag.) Horticulture (Previous year)

Subject Code : **HOR1502** **M.M. 100**

Paper- II (Advances in Post Harvest Technology and Managements of Fruit & Vegetables)

Unit - I : History, importance, present position and scope of preservation. General Principles methods of fruit and vegetable preservative.

Unit - II : Maturity indices, harvesting practices for specific market requirements, influences of pre-harvest practices, enzymatic and textural changes, respiration, biochemistry of fruits and vegetable, ethylene management. Factors leading to post harvest losses, pre-cooling , Treatment prior to shipment, Methods of storage : Zero energy cool chamber, Physical injuries and disorders, Grading, Packing and Transportation, Food Processing, canning of Fruit and vegetables, Fruit juices, bevreages, pickles, Jam, Jelly, candies, preserve and other value added products. Food safety standards.

Unit- III : Post harvest management of important fruit crops: Mango, banana, papaya, guava, apple and grapes.

Unit - IV: Post harvest management of important vegetables crops : Solanaceous fruit vegetables, cole crops, peas and beans, green leafy vegetables, cucurbits and potato.

M.Sc.(Ag.) Horticulture (Previous year)

Subject Code : **HOR1503** **M.M. 50**

Paper - III (Statistical methods & Experimental design)

Unit - I : Elementary statistics : Classification and tabulation of statistical data, graphical and diagrammatic representation (histogram, frequency polygon, frequency curve and cumulative frequency curves), Measures of central tendency (Mean, mode, median, Geometric mean, Harmonic mean) Partition value (Quartiles, deciles and percentiles), Measures of disersion (QRange, Quartile Deviation, Mean Deviation, Standard Deviation), Measures of skewness & Kurtosis.

Unit - II : Correlation and Regression : Bivariate (Frequency, distribution,Karl Pearson's Coefficient of correlation, Regression lines, regression coefficients and their relation with correlation coefficient, Multiple and Partial correlation coefficients.

Unit - III : Probability Theory and Distribution : Random Experiement, Sample space (Discrete case only) Probability (Mathematical and Statistical Definitions, Mutually exclusive events, therem of Total Probability, Theorem of compound probability), Bernoulli trails, Binomical distribution, Poison distribution, Normal distribution, Properties of the above distribution (Without derivation), their uses and fitting with the avialble data.

Unit - IV : Tests of significance : Null and alternative hypothesis, Two types of errots, Power of the test, one tailed and two tailed tests Large and small sample tests (Student's 'Z', Student's 't', Paired 't'and Fisher's 't' tests, Fishers 'z'test, 'F'test'testing of significance of coefficint of correlation). Chi-squares statistic and its uses an a test of goodness of fit, independence of attributes and testing for the variance of population.

Unit- V : Desing of Experiements : Analysis of variance and covariance with one way and two way classification (one observation per cell). Bartlett's test for testing and homogenity of variances, Principles of field experimentation, completely Randomized design, Randomized Block design and Latin Square Design, Missing Plot Technique in Randomized, Block design, Simple factorial experiments of the type 2^2, 2^3 and 2^4. Confounding in factorial expeiments, split-plot experiements.

M.Sc.(Ag.) Horticulture (Previous year)

Subject Code : **HOR1504** **M.M. 100**

Paper - III (Practical on HOR1501 , HOR1502, HOR1503)

Unit - I : Preparation of layout of nursery and orchard. Methods of propagations in fruit crops, identification and Botanical description of Fruit Plants, Cost of cultivation of an orchard, visit to impotant orchard and fruit research stations.

Unit - II : Identification of equipments used in preservation. Canning of fruits and vegetables, Preparation of Jam, jelly, squash, juice, preserve, sauce, pickles. Estimation of acidity, vitamin C, sugar, juice content and T.S.S., Visit to processing factories.

Unit - III: Problems based on Design of Experiments .

M.Sc.(Ag.) Horticulture (Final year)

Subject Code : **HOR1505** **M.M. 100**

Paper - I (Production Technology of Vegetables and spices)

Unit - I : Importance, present positions and scope of vegetable production in India, Types of vegetables growing, protected cultivation of vegetables.

Unit - II : Classification of vegetables, improved production technology of vegetable crops with special reference to origin and distribution, soil and climate, land preparation, improved varieties, sowing, irrigation, fertigation, inter-cultural operation, weed control, physiological disorders, harvesting, seed production and post harvest management, plant protection measures of vegetable crops like solanaceous crops (potato, tomato, brinjal & chillies) Cole crops, Root crops (Carrot, radish). Bulb crops (Onion and garlic), cucurbits, okra, beans. Green leafy vegetables. Spices : Cumin, coriander, fenugreek, fennel, zinger, turmeric.

Unit - III: Breeding and seed production of vegetable crops. Breeding objectives, Breeding methods (Introduction, selection, Hybridization, Mutation, Heterosis breeding, Marker assisted breeding) biotechnological tools used in vegetables espeicially potato, tomato, pepper, okra, gourds , cole crops and spices. Seed production technology of vegetables, types of seeds TPS and its production technique , importance and present status of vegetable seed industry, Intellectual Property Right (IPR)

M.Sc.(Ag.) Horticulture (Final year)

Subject Code : **HOR1506** **M.M. 100**

Paper - II (Advances in Floriculture and Landscaping)

Unit - I : History, importance and scope of floriculture in India. Principles of garden design- initial approaches, axis, focal point, mass effect, unity, space, texture, tone and colour. Landscpe design,s style/type of garden, Formal and informal garden, Mughal garden, Japanees garden, English garden. Garden features (Pavements, fences, hedges and edges, arch, pergola, flower beds, shrubberies, rosery, rockery, topiary, garden adornments, landscaping of high ways, railway station, bank of river and canals and public places etc. Bio-aesthetic planning, eco-tourism, indoor gardening, lawn and turf management.

Unit - II : Production Technology of flower crops with reference to origin, distribution, soil and climate, improved varieties, sowing and planting, irrigation, fertigation, intercultural operation, harvesting, insect-pest and disease control. post harvest handling, packing, storage, marketing of following crops : Rose, chrysanthemum, Dahlia, carnation, gladiolus, tuberose, orchid, aster, marigold, Gerbera. Protected cultivation of flowering plants. types of value added products, valuea ddition in flowers, flower arrangement, Ikebana, Moribana, bouquets, concrete and essential oil.

Unit - III : Breeding methods, suitable for flowering plants (Introduction, selection, domestication, polyploid and mutation breeding, hererosis breeding, breeding constriants and achievement of commercial flower).

M.Sc.(Ag.) Horticulture (Final year)

Subject Code : **HOR1507** **(SPECIAL PAPER)** **M.M. 100**

Paper - III (Advances in Medicinal & Aromatic and Plantation Crops)

Unit- I : Importance of medicinal and aromatic plants in human health, national economy and related industries, classification of medicinal and aromatic plants according to botanical characteristics and their uses, export potential and indigenous technical knowledge; climate and soil requiurement, cultural practices, yield and important constituents of medicinal plants (mulhati, Isabgol, Rauwolfia, poppy, Aloevera, satvar, Stevia, Safed Musali, Kalmegh, Nux vomica, etc.) and Aromatic plants (citronella, Palmarosa, mentha, basil, lemon grass, Rose, Geranium)

Unit- II : Production of plantation crops. Role of plantation crops in national economy, export potential IPR issues. Plant multiplication system of cultivation, multitier cropping, high desnisty planting, nutritional requirements, physiological disorders, weed management, training and pruning, crop regulation, harvesting, organic farming. Plantation crops: coffee, tea, cashew, cocoa, rubber, oil palm, coconut, arecanut, betel vine.

Unit- III: Breeding of Plantation and medicinal & Aromatic plants : Crop improvents by breeding methods like introduction, selection, hybridization, mutation breeding, polyploid breeding and biotechnological approach of plantation and medicinal & aromatic plants.

Unit- IV : Processing technique of plantation and medicinal & aromatic crop produce. Study of Aroma compound and value addition.

M.Sc.(Ag.) Horticulture (Final year)

Subject Code : **HOR1508** **M.M. 100**

Thesis / Research Project

Aim of introducing thesis in M.Sc.(Ag.) Horticulture is to give the students preliminary exposure for conducting the research and presenting its findings systematically and scientifically in a manuscript shape. To fulfill this goal, a specific topic for thesis research shall be assigned to eligible student by the teacher(s) /supervisor(s) of the department. Student will submit a written report to the department before commencement of the examination of the final year. Thesis/report will be evaluated by the exernal and internal examiners. The external and internal examiners will also conduct the viva-voce based on project report.

Paper code : HOR1511 M.M. 50

Viva-voce based on Project Report.

M.Sc.(Ag.) Horticulture (Final year)

Subject Code : **HOR1509** **M.M. 100**

Practical on (1505 & 1506)

Unit- I : Identification and morphological features of vegetable and speices, seed production techniques, study of disorders, use of PGR, basal and foliar application of nutrients, cost of production of vegetable and spices : experimental trial , hybridization techniques etc. visit to research station.

Unit - II : Identification of ornamental species, layout of herbaceous border, shrubbery border, edging, bungalow compound, Roadside aveneus plant, propagation techniques, cost of production of commercial flowers, visit to ornamental gardens.

M.Sc.(Ag.) Horticulture (Final year)

Subject Code : **HOR1510** **M.M. 50**

Viva-voce/Practical on HOR1507

(Special Paper)

Identification and botanical description of medicinal and aromatic plants and plantation crops, Methods of propagations, cost of production of medicinal /aromatic and plantation crops. Visit to research station.