

GURU KASHI UNIVERSITY
UNIVERSITY COLLEGE OF AGRICULTURE
MASTER OF SCIENCE - VEGETABLE SCIENCE

SUBJECT CODE	SUBJECT NAME	L	T	P	Credits
506001	Production Technology of Summer Season Vegetable Crops*	2	-	-	2
506002	Lab- Production Technology of Summer Season Vegetable Crops*		-	2	1
506003	Production Technology of Winter Season Vegetable Crops*	2	-	-	2
506004	Lab- Production Technology of Winter Season Vegetable Crops*		-	2	1
506005	Breeding of Self Pollinated and Vegetative Propagated Vegetable Crops*	2	-	-	2
506006	Lab- Breeding of Self Pollinated and Vegetative Propagated Vegetable Crops*		-	2	1
506007	Breeding of Cross Pollinated Vegetable Crops*	2	-	-	2
506008	Lab- Breeding of Cross Pollinated Vegetable Crops*		-	2	1
506009	Systematic of Vegetable Crops*	2	-	-	2
506010	Lab-Systematic of Vegetable Crops*		-	2	1
506011	Post Harvest Handling of Vegetable Crops*	2	-	-	2
506012	Lab- Post Harvest Handling of Vegetable Crops*	-	-	2	1
506013	Principles of Plant Breeding.	2	-	-	2
506014	Lab-Principles of Plant Breeding.		-	2	1
506015	Principles of quantitative Genetics	2	-	-	2
506016	Lab-Principles of quantitative Genetics		-	2	1
506017	Production technology of Under Exploited Vegetable crops	2	-	-	2
	Any one course from major in the Fruit Science	2	-	-	2
	Lab –The course opted above		-	2	1
504015	Soil Fertility and Fertilizer Use	2	-	-	2
504016	Lab- Soil Fertility and Fertilizer Use.	-	-	2	1
504021	Agriculture Statistics	3			3
504022	Lab- Agricultural Statistics		-	2	1
506018	Seminar		-	4	2
504024	Lab-Fundamental of computer application		-	2	1**

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504025	Lab- Library and Information Services		-	2	1**
504026	Lab-Technical Writing and Communication Skills		-	2	1**
506019	Masters Research		-	48	24**
	Total	25		80	38+27(NC)

**= Non credit(NC)

Note: 1 Dean College of agriculture will offer a course load between 12-18 credit hours per semester

2 A flexible system will be adopted for offering the courses. The students of I & II year class can jointly opt for a course

Course Content- Vegetable Science

506001 Production Technology of Summer Vegetable Crops

2

Introduction, nutritional value, origin, botany and taxonomy, important countries and states growing vegetables along with area, climate and soil requirements, commercial varieties/hybrids evolved by private and public sector, sowing/ transplanting time, seed rate, seed treatment, nutritional and irrigation requirements, chemical weed control, mulching, physiological disorders, harvesting techniques, post-harvest management, plant protection measures and seed production of warm season vegetable crops i.e. solanaceous crops, okra, cucurbitaceous crops, cowpea, sweet potato, clusterbeans, amaranth, basella, kang-kong, tapioca. Poly-house, net-house and low tunnel technology for off-season production of summer vegetables

506002 Lab- Production Technology of Summer Vegetable Crops

1

Experiments to demonstrate the role of mineral elements. Fertigation. Chemical weed control. Hybrid seed production of summer vegetables. Use of growth regulators. Seed extraction techniques. Identification of pests and diseases and their control. Forcing techniques for raising summer vegetables. Pruning, grafting and staking. Quality determination for sugar, capsaicin and minerals using atomic absorption.

506003 Production Technology of Winter Season Vegetable Crops

2

Introduction, nutritional value, origin, botany and taxonomy, important countries and states growing vegetables along with area, climate and soil requirements, commercial varieties/hybrids evolved by private and public sector, sowing/ transplanting time, seed rate and seed treatment, nutritional and irrigation requirements, chemical weed control, mulching, physiological disorders, harvesting techniques, post-harvest management, plant protection measures and seed production of potato, cole crops; cabbage, cauliflower, knol khol, broccoli, brussels' sprout, chinese cabbage, root crops; carrot, radish, turnip, beet root, bulb crops; onion and garlic, peas and beans, green leafy cool season vegetables.

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506004 Lab- Production Technology of Winter Season Vegetable Crops **1**

Study of nutrient deficiency symptoms. Experiments on improved water use efficiency through mulching and different irrigation methods. Different methods of weed control and herbicide sprays. Preparation of cropping scheme for commercial farms. Quality evaluation for carotene, protein and ascorbic acid. Visit to an established vegetable farm in the region.

506005 Breeding of Self Pollinated and Vegetative Propagated Vegetable Crops **2**

History of vegetable breeding. Origin, botany, taxonomy, cytogenetic, genetics, breeding objectives, breeding methods (introduction, selection, hybridization, mutation), resistance breeding for biotic and abiotic stress, quality improvement in self-pollinated crops viz. tomato, brinjal, cowpea, pea, beans, okra, salad crops and asexually propagated crops like potato, sweet potato, colocasia and tapioca. Molecular marker, marker assisted breeding and QTLs, biotechnology and their use in breeding in self pollinated and vegetatively propagated vegetable crops. Issue of patenting, PPV&FRA. Concept of ideotypes. Present status of varietal/hybrid development in India. New approaches in breeding of self pollinated vegetables.

506006 Lab- Breeding of Self Pollinated and Vegetative Propagated Vegetable Crops **1**

Selection of desirable plants from breeding population. Observations and analysis of various qualitative and quantitative traits in germplasm, hybrids and segregating generations. Induction of flowering. Selfing and crossing techniques in vegetable crops. Hybrid seed production of vegetable crops in bulk. Screening techniques for insect-pests, disease and environmental stress resistance in above mentioned crops. Demonstration of sib-mating and mixed population. Molecular marker techniques to identify useful traits in the vegetable crops and special breeding techniques.

506007 Breeding of Cross Pollinated Vegetable Crops **2**

History of vegetable breeding, Origin, botany, taxonomy, cytogenetic, genetics, breeding objectives, breeding methods (introduction, selection, hybridization, mutation), quality improvement, in cross pollinated crops viz. capsicum, chilli, cucurbits (muskmelon, watermelon, cucumber, bottle gourd, longmelon, bitter gourd, sponge gourd, summer squash), cole crops (cabbage, cauliflower, broccoli, brussels'), asparagus, leafy vegetables and spices (black pepper, turmeric, cardamom, coriander). Molecular marker, marker assisted breeding and QTLs, biotechnology and their use in breeding cross pollinated vegetable crops. Present status of varietal/hybrid development in India. New approaches in breeding of cross pollinated vegetables.

506008 Lab- Breeding of Cross Pollinated Vegetable Crops **1**

Selection indices in cole crops, cucurbitaceous crops, bulb crops, root crops, leafy vegetables and spices. Selfing and crossing techniques in cross pollinated vegetable crops. Biometrical analysis -Line x tester analysis, North Carolina Designs, Stability analysis, Triple test cross analysis, generation mean analysis, diallel analysis. Estimation of heritability, heterosis and combining ability.

506009 Systematics of Vegetable Crops **2**

Principles of classification, different methods of classification, salient features of international code of nomenclature of vegetable crops. Origin, history, evolution and distribution of vegetable crops,

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botanical description of families, genera and species covering self and cross pollinated vegetable crops viz. brinjal chilli, tomato, muskmelon, water melon, bottle gourd, cucumber, bitter gourd, onion, cabbage, cauliflower, carrot, radish, turnip, amaranth, palak, peas, beans, okra and vegetatively propagated vegetables like potato, garlic, sweet potato and spices (turmeric, coriander); cytological level of various vegetable crops, descriptive blanks for describing various varieties of important vegetable crops.

506010 Lab- Systematics of Vegetable Crops **1**

Identification, description, classification and maintenance of vegetable species and varieties. Survey, collection of allied species and genera locally available. Preparation of keys to the species and varieties. Methods of preparation of herbarium and specimens.

506011 Post-harvest Handling of Vegetable Crops **2**

Determination of maturity in different vegetable crops, assessment of post-harvest losses, pre-harvest methods and practices effecting post-harvest shelf life of vegetables, mechanized harvesting of vegetables, pre-cooling of vegetables using different techniques, post-harvest chemical and nonchemical treatments to enhance shelf life, sorting and grading for packaging, ripening of vegetables, packaging of vegetables including latest techniques like MAP, storage of vegetables including latest techniques like CA storage, food safety and quality, non-destructive methods of quality analysis, quality of raw material for processing, transportation and destination handling, marketing, treatments before shipment and storage, fresh-cut vegetables.

506012 Lab - Post-harvest Handling of Vegetable Crops **1**

Practices in judging the maturity of vegetables, harvesting methods and tools. Methods used for pre-cooling and their efficiency measurements. Post-harvest chemical treatments to extend shelf life. Sorting and grading methods. Ripening techniques used in climacteric vegetables. Traditional and latest safe storage techniques. Respiration measurements in harvested produce. Field visit to post-harvest and processing industry.

506013 Principles of Plant Breeding **2**

History of Plant Breeding, objectives and achievements. Centres of origin, biodiversity and its significance. Plant introduction and role of plant genetic resources in plant breeding. Genetic basis of breeding self- and cross-pollinated crops, Mating systems and response to selection. Pure line theory. Breeding methods in self-, cross-pollinated and asexually reproducing crops. Heterosis and inbreeding. Concept of plant ideotype. Transgressive breeding. Hybrid breeding. Self-incompatibility and male sterility in crop plants and their commercial exploitation. Mutation breeding. Breeding for abiotic and biotic stresses. Testing, release and notification of varieties. Maintenance breeding. Participatory Plant Breeding. Plant Breeders' Rights and regulations for plant variety protection and farmers' rights.

506014 Lab- Principles of Plant Breeding **1**

Floral biology of self- and cross-pollinated species. Selfing and crossing techniques. Selection methods in segregating populations and evaluation of breeding material. Maintenance of

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experimental records. Estimation of heterosis and inbreeding depression. Techniques in hybrid seed production using male-sterility in field crops

506015 Principles of Quantitative Genetics **2**

Mendelian traits vs polygenic traits. Quantitative traits and their inheritance. Multiple factor hypothesis. Nature of gene action, epistatic and linkage effects. Analysis of Variance and variance components. MANOVA. Biplot analysis. Comparison of means and variances for significance. Designs for experiments. Genetic diversity analysis. Association analysis. Path analysis and parent-progeny regression analysis. Discriminant function and principal component analyses. Selection indices. Heritability and genetic advance. Generation mean analysis. Mating designs. Genotype x environment interaction. Stability parameters. AMMI analysis - principles and interpretation. QTL mapping. Marker assisted selection (MAS).

506016 Lab - Principles of Quantitative Genetics **1**

Multiple factors inheritance. Partitioning of variance. Heritability and genetic advance. Covariance analysis. Metroglyph analysis. D2 analysis, cluster diagrams and dendrograms. Correlation analysis. Path analysis. Parent-progeny regression analysis. Diallel analysis. NCD. Line x tester analysis. Generation mean analysis. QTL mapping. Bi-parental mating and Triple Test Cross Stability analysis. AMMI model. Principal component analysis. Biplots and mapping genotypes. Construction of saturated linkage maps.

506017 Production Technology of Under Exploited Vegetable Crops **2**

Introduction, botany and taxonomy, climatic and soil requirements, commercial varieties/hybrids, sowing/planting times and methods, seed rate and treatment, nutritional and irrigation requirements, intercultural operations, weed control, mulching, physiological disorders, harvesting, post harvest management, plant protection measures and seed production of asparagus, artichoke, leek, Brussels sprout, chinese cabbage, broccoli, kale, amaranth, celery, parsley, parsnip, lettuce, rhubarb, spinach, basella, bathu (chenopods), elephant foot, yam, lima bean, winged bean, vegetable pigeon pea, jackbean, sword bean, spine gourd, pointed gourd, oriental pickling melon and little gourd (kundru).

506018 Seminar **1**

506019 Masters Research **24(NC)**