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

SUBJECT CODE	SUBJECT NAME	L	T	P	Credits
505001	Tropical & Dryland Fruit Production *	2	-	-	2
505002	Lab- Tropical & Dryland Fruit Production *	-	-	2	1
505003	Sub- tropical and Temperate Fruit Production*	2	-	-	2
505004	Lab-Sub- tropical and Temperate Fruit Production*		-	2-	1
505005	Nutrition and Canopy management in Fruit Crops.*	2	-	-	2
505006	Lab- Nutrition and Canopy management in Fruit Crops.*	-	-	2	1
505007	Post harvest Tech in Fruit Crop*	2			2
505008	Lab- Post harvest Tech in Fruit Crop*	-	-	2	1
505009	Principles and Practices of Plant Propagation.*	2	-	-	2
505010	Lab- Principles and Practices of Plant Propagation.*		-	2	1
505011	Growth and Development of Horticulture Crops*	2	-	-	2
505012	Lab- Growth and Development of Horticulture* Crops		-	2	1
505013	Breeding of Fruit Crops*	2	-	-	2
505014	Lab- Breeding of Fruit Crops *		-	2	1
505015	Orchard Management and Organic Horticulture*	2	-	-	2
505016	Lab- Orchard management and Organic* Horticulture		-	2	1
	Any one course from major in the Vegetable 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
504019	Plant physiology	2	-	-	2
504020	Lab-Plant Physiology		-	2	1
504021	Agriculture Statistics	3			3
504022	Lab- Agricultural Statistics.	-	-	2	1
505017	Seminar		-	4	2
504024	Lab- Fundamental of Computer Application		-	2	1**
504025	Lab- Library and Information Services		-	2	1**
504026	Lab- Technical Writing and Communication Skills		-	2	1**

505018	Masters Research		-	48	24**
	Total	**25**		**82**	**39+27(NC)**

*= Major courses in Fruit Science ** =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 -Fruit Science

505001 Tropical and Dryland Fruit Production 2

Origin, distribution, commercial importance and export potential. Ecophysiological requirements. Species and varieties. Rootstocks and propagation. Planting, root zone, training and pruning. Nututrition and water requirements , fertigation, role of bio-regulators, major pests, diseases, physiological disorders and their control measures. Abiotic factors limiting fruit production. Flowering, pollination and fruit set. Quality improvement . Storage and ripening techniques. Industrial and export potential, Agri. Expert Zones (AEZ) and industrial support . Fruit crops- citrus, mango, papaya, pineapple, banana, avocado, sapota, guava, ber, amla, jack fruit, annonas and minor fruits of tropics.

505002 Lab- Tropical and Dryland Fruit Production 1

Description and identification of species and varieties. Growth and development. Growth regulation. Nutritional and physiological disorders and their control. Rejuvenation of old and unproductive trees. Visit to commercial orchards. Project preparation for establishing commercial orchards.

505003 Sub- tropical and Temperate Fruit Production 2

Origin, distribution, commercial importance and export potential. Ecophysiological requirements. Species and varieties. Rootstocks and propagation. Planting, root zone, training and pruning. Nututrition and water requirements , fertigation, role of bio-regulators, major pests, diseases, physiological disorders and their control measures. Abiotic factors limiting fruit production. Flowering, pollination and fruit set. Quality improvement . Storage and ripening techniques. Industrial and export potential, Agri. Expert Zones (AEZ) and industrial support . Fruit crops- Apple , pear, quince, grapes, plum, peach, apricot, cherries, hazelnut, litchi, loquat, persimmon. Kiwifruit, strawberry, walnut, almond, pistachio, pecan, mangosteen, carambola, bael ,wood apple, fig, jamun, rambutan and pomegranate.

505004 Lab- Sub- tropical and Temperate Fruit Production 1

Description and identificaLtion of species and varieties. Growth and development. Growth regulation. Nutritional and physiological disorders and their control. Rejuvenation of old and unproductive trees. Visit to commercial orchards. Project preparation for establishing commercial orchards

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505005 Nutrient and Canopy Management in Fruit Crops 2

Essential elements, criteria of essentiality. Natural sources and fertilizers. Role of essential elements in fruit plants. Interaction of nutrients. Canopy types and structures. Light interception and distribution in different types of tree canopies. Spacing and utilization of land area. Canopy management through the use of rootstock and scion, plant growth inhibitors, training and pruning and management practices. Canopy development in relation to growth ,flowering, fruiting and fruit quality in temperate fruits, grapes, pomegranate, mango, sapota, guava, citrus and ber.

505006 Lab- Nutrient and Canopy Management in Fruit Crops 1

Leaf sampling techniques, Determination of nutrient status through soil and plant analysis. Study of different types of canopies. Training of plants for different canopy types. Canopy development through pruning, use of plant growth inhibitors and, geometry of planting . effect of canopy types on production and quality of fruits.

505007 Post- harvest Technology for Fruit Crops 2

Importance and scope. Maturity indices, harvesting practices and grading for specific market requirements. Influence of pre- harvest practices, enzymatic and textural changes, respiration and transpiration. Physiology and biochemistry of fruit ripening, ethylene evolution and its management. Pre-cooling. Factors leading to post-harvest losses. Treatments prior to transpiration and transpiration viz. Chlorination, waxing , chemicals, bio-control agents, natural plant products fungicides, hot-water, vapour heat treatment, sulphur fumigation and irradiation. Methods of storage. Physical injuries and. Disorders during storage. Packing methods and transport, Quality evaluation.

505008 Lab- Post- harvest Technology for Fruit Crops 1

Analyzing maturity stages of commercially important fruit crops, harvesting methods, pre-cooling methods, grading. Pre- harvest and post- harvest application of growth substances, fungicides, nutrients , waxes and hot water treatments, sulphuring. Improved packing and storage of important horticultural commodities. Physiological loss in weight of fruits. Estimation of transpiration, respiration rate, ethylene release. Estimation of quality characteristics in stored fruits. Cold chain management- visit to cold storage and CA storage unit

505009 Principles and Practices of Plant Propagation. 2

Introduction , life cycles in plants, cellular basis for propagation. Sexual propagation-apomixes, polyembryony, chimeras. Factors influencing seed germination, hormonal regulation of germination and seedling growth, Seed quality, treatment, packing, storage, certification and testing. Rooting of cuttings under mist and hot beds. Physiological , anatomical and biochemical aspects of root induction in cuttings. Selection of elite mother plants. Establishment of bud wood bank. Stock, scion and inter stock relationship and Incompatibility. Physiology of dwarfing rootstocks. Rejuvenation. Progeny orchard and scion bank. Micro-Propagation-in vitro clonal propagation, direct organogenesis, embryogenesis, micro grafting and meristem culture. Hardening, packing and transport of micro- propagules. Nursery structures.

505010 Lab- Principles and Practices of Plant Propagation. 1

Anatomical studies in rooting of cutting and graft union. Propagation structures. Use of media and PGR . Micro propagation and hardening of plants. Explant preparation, media preparation, culturing in vitro, clonal propagation, meristem culture, shoot tip culture, axillary bud culture, Micro grafting and hardening . Visit to TC labs and nurseries

505011 Growth and Development of Horticulture Crops 2

Parameters of growth and development. Growth dynamics and morphgenesis. Annual, semi-perenial and perennial fruit crops. Effect of light and temperature. Assimilate partitioning during growth and development. Effect of water and mineral nutrition. Biosynthesis and role of growth promoters and inhibitors. Physiology of dormancy, nud break, juvenility, vegetative to reproductive inter phase, flowering, pollination, fertilization, fruit set, fruit drop, fruit growth, ripening and seed development. Growth and developmental processes during stress. Impact of pruning, training and chemical manipulations in fruit crops.

505012 Lab- Growth and Development of Horticulture Crops 1

Dormancy mechanisms and stratification of seeds. Visit to different fruit zones to identify growth and development patterns. Techniques of growth analysis. Evaluation of photosynthetic efficiency. Study of growth regulator functions, hormone assays and ripening phenomenon in fruits

505013 Breeding of Fruit Crops 2

Origin and distribution, taxonomical status of species and cultivars. Cytogenetics and genetic resources. Blossom biology, breeding objectives, systems and ideotypes. Crop improvement through introduction, selection, hybridization, mutation breeding, polyploid breeding and rootstock breeding. Improvement of quality traits. Resistance breeding for biotic and abiotic stresses. Biotechnological interventions, achievements and future thrust. The important temperate, sub- tropical and tropical fruit crops will be covered.

505014 Lab- Breeding of Fruit Crops 1

Characterization of germplasm. Blossom biology and anthesis. Estimating fertility status. Practices in hybridization, ploidy breeding, mutation breeding, evaluation of biometrical 168 and quality traits. Screening for resistance, developing breeding programme for specific traits.Visit to research stations.

505015 Orchard Management and Organic Horticulture 2

Soil quality and its management for orchard plantation. Effect of soil organic matter on physicochemical characteristics of the soil. Moisture conservation and water requirement for fruit crops. Principles, methods and scheduling of irrigation. Principles and status of organic horticulture. Organic farming systems. Organic inputs and their role. EM technology and its impact. Indigenous practices of organic farming, sustainable soil fertility, weed management and biological/ natural control of pests and diseases. Fruit quality improvement. Good Agricultural Practices(GAP),

HACCP and certification of organic products. Standard evolved by different agencies. Constraints in certification , organic horticulture and export.

505016 Lab- Orchard Management and Organic Horticulture **1**

Different methods of irrigation. Mulching and weed control in orchards. Determination of soil organic matter. Inter-cropping exercises. Input analysis of manures. Bio-composting, biofertilizers and their application. Methods of preparation of organic manures. EM technology and products. Biological/natural control of pests and diseases. Soil solarization. Case studies. Residue analysis in organic products and documentationits. Stress impact on growth and development

505017 Seminar **1**

505018 Masters Research **24(NC)**