ANNEXURE-II

Broad Outlines of Syllabus for Doctorate Degree Programme Entrance Exam- 2025

SYLLABUS:

Objective of such type of Entrance Test is to select the best candidates; therefore, no syllabus can be prescribed, however, broad outlines are given as follows:

AGRICULTURE

1. AGRICULTURAL ECONOMICS

Basic concepts in economics, theory of consumer demand, theory of production, market classification, theory of perfect and imperfect competition, theory of distribution, national income accounting, classical and Keynesian theories of income determination, money-concepts, functions, theories of demand for money, supply of money; general equilibrium of product and money markets; IS and LM functions; monetary and fiscal policies, banking - central and commercial, functions and problems of recent macroeconomic, policies of Government of India; research methodology, steps in agricultural economics research, data collection, analysis and report writing; simultaneous linear equations, linear programming, statistical inference, correlation and regression analysis, time series analysis and theory of index numbers. Nature and scope of agricultural production economics *vis-a-vis* farm management; farm business analysis, farm records and farm cost accounting; farm planning and budgeting, production function and resource allocation; assumptions of production function and different form of production functions, cost, profit and supply functions; nature and analysis of risk in farming; systems approach in farming; role of credit in agriculture, principles of agricultural finance, farm financial management, supply and demand for farm credit; recent innovations in the extension of credit to agriculture, theory and practice of cooperation; problems of cooperatives, management of co- operative institutions; cost-benefit analysis of agricultural projects. Scope of marketing in a developing economy; practice and problems of marketing agricultural inputs and outputs; functions and channels of marketing, co-operative marketing; agricultural price analysis; demand analysis; problems and prospects of storage and processing of agricultural products; agricultural exports -problems and prospects. Market intermediaries and their role, marketable & marketed surplus estimation, marketing efficiency, market integration, APMC regulated markets - Direct marketing, contract farming and retailing - Supply chain management, role of information technology, telecommunication in marketing of agricultural commodities. Theory of growth and growth models; agricultural policy, planning and development in India, interregional variations in agricultural development, agricultural technology and income distribution; agrarian reforms and output and input price policies; infrastructure and institutions for agricultural development, equity and ecological consideration in agricultural development. OLS and their properties, multi-collinearity, heteroscedasticity and autocorrelation. Concepts, classification and problems of natural resource economics- Economy Environment interaction, Resource scarcity - Limits to Growth - Measuring and mitigation natural resource scarcity, common property rights, sustainability, environmental pollution.

2. AGRONOMY

Principles of crop production, crop plants in relation to environment, concepts involved in growth analysis; quantitative agro-biological principles and their validity; classification of climate, agro- climatic zones of India and Rajasthan, their characteristic features; physiological limits of crop yield and variability in relation to the agro-ecological optimum; types of tillage - concepts and practices; resource conservation technology. Weed ecology & physiology; crop-weed interference; methods of weed control; principles and practices of weed management in crops and cropping systems; herbicide- formulations, classification, selectivity and mode of action; adjuvants; integrated weed management; herbicide resistance, fate of herbicides. Agro-

meteorology in relation to crop environment; solar radiation utilization & photosynthesis; air temperature and humidity; monsoon characterization; weather forecasting; climate change: its impact on agriculture, mitigation and adaptation. Introduction, origin, history, production, distribution, cultural practices, varieties, quality, biomass production and bioenergetics of major field crops, forage, spices and condiment crops. Soil fertility and its management; essential plant nutrients, their functions and deficiency symptoms in plants; dynamics of major plant nutrients; organic manures, chemical and biofertilizers and fertilizer uses; integrated plant nutrient management; precision farming & site-specific nutrient management; organic farming: concept,principles & components, quality parameters, labeling, certification & accreditation process. History of irrigated agriculture, soil-water-plant relationship, soil moisture constants and soil water availability to plants, soil moisture stress and plant growth; drought resistance in crops, mechanisms of droughttolerance, and crop adaptability, soil and plant moisture conservation techniques, water harvesting and other agro techniques for dryland agriculture; measurement of soil moisture, methods of scheduling irrigation, methods of irrigation for crop plants, quality of irrigation water; watershed management concepts; management of excess soil water, agricultural drainage, principles and practices; problem soils- saline, alkali, saline-alkali and acid soils, soil erosion and its control. Cropping systems – principles and practices and assessment; changing cropping patterns in different agro-climatic zones; crop diversification, IFS, Sustainability - concept and practices; agro-forestry systems - concepts and practices. Principles of experimental designs, analysis and interpretation of data, methods of statistical analysis and statistical designs. Suitable farming systems for organic management, organic crop production systems, organic input production technologies.

3. ENTOMOLOGY

Position of insects in animal kingdom - their origin, phylogeny and distribution; history and basis of insect classification; distinguishing characters of insect Orders and economically important families; concept of species and speciation; rules and regulations of zoological nomenclature; morphology - external and internal; embryonic and post-embryonic development. Insect ecology - biotic potential, biotic and abiotic resistance, effect of temperature, humidity and light on insect development and population dynamics; diapause, food chain, migration and dispersal. Life table concept, survivorship curves, degree-day model, predator prey relationship, diversity indices (index). Fundamentals of insect physiology, different systems, their structure and function, metabolism, sense organs, insect behavior, host plant relationship, ecosystems, horticultural crops, host parasite relationship. Social and other beneficial insects; pests of field crops and stored food; principles of pest control; classification, mode of action and metabolism of insecticides; insecticidal residues; resistance and resurgence; parasites, predators and pathogenic microorganisms of crop pests, biological control. Antifeedants, hormones, growth regulators, semio-chemicals, host-plant resistance and genetic manipulation, insect quarantine; concept of integrated pest management; non-insect pests and their control. Principles of experimental designs, analysis and interpretation of data, methods of statistical analysis and statistical designs.

4. AGRICULTURE EXTENSION AND COMMUNICATION

Objectives, philosophy and principles of extension education; extension role of agricultural universities; comparative studies of extension education system in selected developed and developing countries; different models of organizing agricultural extension, particularly tools and methodology; agricultural information (knowledge) system; teaching and learning processes; principles of adult learning; audio visual aids and their classification; modern communication and information technology; application of PERT/CPM, principles of programme planning process; agricultural and rural development programmes in India, namely CD, Panchayati raj System, IADP, IRDP, SGSY, PMGSY, DPAP, KVK, ATIC, ATMA, IVLP, ICDS, NREGP, Farmers Field School, Kisan Call Centre. Principles of extension management, different theories of management processes and functions ofmanagemental organizational set-up for extension services in India including the T & V system; types of training programmes for

extension personnel and farmers; model of modern training, modern technologies, experimental learning methods, entrepreneurial development process; factors affecting extension training. Participatory extension approaches (RRA, PRA, PLA, AEA, PAR, FPR); Participatory tools and techniques; Participatory technology development and dissemination. Scope and importance of psychology in extension education, concept of human society; characteristics of rural people; socio-psychological basis of human behavior, socio-psychological factors in transfer of technology; social structure; social interactions and processes; values and norms of rural social systems; rural institutions; role of leadership; process of diffusion and adoption; consequences of adoption of innovations; communication process and elements of communication; theories of communication, fundamentals of farm journalism; role of mass media; modern electronic media. Process of scientific research; research designs; data collection devices; validity and reliability of measuring devices; methods of observation and data collection; techniques of tabulation; analysis of data and report writing;methods of statistical analysis; statistical designs.

5. GENETICS AND PLANT BREEDING

Structure and function of cell and cell organelles, cell cycle; mitosis and meiosis; nucleic acids – their structure; Mendelian principles; gene interaction, multiple alleles, chromosome structure and organization; types of chromosomes; chromosome function; linkage and crossing over - theories and molecular mechanism; recombination and gene mapping in diploids, fungi, bacteria and human; ploidy variations - euploids and aneuploids; chromosomal aberrations; extra chromosomal inheritance; gene mutation-mechanism, induction; gene concept; complementation, genetic code, information transfer and protein synthesis, gene regulation and gene manipulation; gene transfer technology; origin and evolution of important crop plants like wheat, rice, maize, sugarcane, potato, brassica, cotton, etc. Genetic basis of breeding; pure line selection; male sterility and incompatibility and their use in plant breeding; principles and methods for self and cross pollinated crops and vegetatively propagated crops; heterosis; plant introduction and exploration and their role in plant breeding; breeding for disease, insect and pest resistance; role of interspecific and intergenic hybridization; combining ability and its relationship with the components of gene action; seed production techniques; PBR, IPR, PPV&FR act 2001, farmers rights: changes in gene frequencies; mutation and its role in breeding; use of biotechnology in plant breeding. Molecular markers and their applications in genetic analysis and plant breeding. Genetic engineering & its tools, QTL and marker assisted selection. Inheritance of quantitative traits, polygenes, continuous variation, components of genetic variation, heritability and genetic advance, G x E interaction stability analysis, gene action, combining ability & it estimation, parent offspring regression. Principles of experimental designs, analysis and interpretation of data, methods of statistical analysis and statisticaldesigns.

6. LIVESTOCK PRODUCTION AND MANAGEMENT

Livestock and poultry - population and production dynamics and economic importance, Advances in housing management of livestock and poultry in various agroclimatic zones of India. Feeding, breeding and health management of cattle and buffaloes. Establishing Dairy Cattle Enterprise. Milking practices & clean milk production. Numbers and distribution of milch and dual-purpose breeds of cattle and buffaloes. Small ruminants farming in India, important breeds and importance in national economy. Feeding, breeding and health management of goat and sheep, housing practices and requirement for goat and sheep, production systems, feeding practices, nutrient deficiencies in forages. Selection of breeding stock and breeding problems in sheep and goat. Present development programmes in sheep and goat production. Present and future of Swine production systems in India and production policies adopted in advanced countries. importance and limitation of rabbits for meat and fur production. Feeding, breeding and housing management and breeds of camel. Common breeds and strains of poultry. Utilization and disposal of animal waste. Health hazards, waste utilization, technologies for processing and treatment of animal waste. Role of climatic factors in production and health of animals. Climate resilient livestock production

systems. Principle of animal experimentation. Planning and designing of experiments. Integration of Research in various disciplines of animal production. Scientific writing research papers, reviews and reports etc. and their presentation. Principles of experimental designs, analysis and interpretation of data, methods of statistical analysis and statistical designs.

7. MOLECULAR BIOLOGY AND BIOTECHNOLOGY

Structure and organization of prokaryotic and eukaryotic cells; Cytoskeletal elements; organization and expression of prokaryotic and eukaryotic genome; concept of gene; quantitative trait loci, mutation; genetic recombination; transformation; transduction; conjugation; structure, function and regulation of genes in prokaryotes and eukaryotes; transcription and translation; recombinant DNA, restriction enzymes, vectors, plasmids, cosmids and bacteriophages, expression vectors, cloning strategies, construction and screening of genomic and cDNA libraries, nucleic acid hybridization and DNA sequencing; restriction fragment length polymorphism; monoclonal antibodies and their application; enzyme engineering; genetic transformation of eukaryotes; crop improvement through genetic engineering; role of tissue culture in crop improvement; microbes in agriculture and industry; structure and function of proteins, nucleic acids, carbohydrates, lipids, enzymes; metabolism, glycolysis,citric acid cycle; respiration, bioenergetics; nucleic acid and protein biosynthesis; photosynthesis, nitrogen fixation. PR in Biotechnology. Biosafety and Bioethics issues. Cell division and regulation of Cell cycle; Membrane transport; Signal transduction; Protein targeting; Molecular maker and its application in Agriculture; Genomics, Proteomics and metabolomics; Properties of nanomaterials and characterization, Synthesis and Application of nanomaterials. Introduction to Bioinformatics and Biological database. BLAST and FASTA.

8. NEMATOLOGY

Nematode and it's characteristics , History and development of Nematology in India and abroad , Nematode habitats and diversity - Plant , animal , human parasites and entomo-pathogenic nematodes , Economic importance of nematodes in Agriculture, Extraction of nematodes from soil and plant material, Staining nematodes in plant tissues, Estimation of population densities, Killing , fixing and preservation of nematodes, Preparation of permanent and semi-permanent mounts, perineal patterns and vulval cone of nematodes , Isolation and culture techniques of nematodes , Organization of nematode body, Morphology of plant parasitic nematodes - Body Wall, digestive, reproductive, excretory and nervous system, Principles of nematode taxonomy and its importance, Placement of nematodes in Animal Kingdom and comparison with related organisms, Phylum- Nematoda and it's classes , Classification and characteristics of important Tylenchid, Aphelenchid and Dorylaimid nematodes. Biology and ecology of nematodes, Patterns of Nematode life cycle, Distribution and dispersal of nematodes. Types of nematode parasitism, Nematode behavior - Hatching, moulting, host finding, feeding and reproduction, Survival strategies of nematodes in adverse environmental conditions, Effect of abiotic and biotic factors on nematodes, Chemical composition of nematodes, hydrolytic enzymes, pseudocoelom and its function, Plant nematode relationships, Cellular responses to infection by important plant parasitic nematodes, Interaction of plant parasitic nematodes with other micro-organisms (Fungi, Bacteria ,Viruses etc.), Nature of damage and symptomatology , Nematode diseases of Cereals, Pulses , Oil seed, Vegetables, Fruit , Ornamental , Fiber and Plantation crops, Nematode problems of protected cultivation , Crop loss estimation, ecological and socio-economic aspects , pest risk analysis of important nematodes, Principles and practices of nematode management - Physical, cultural, host resistance, biological, chemical and regulatory methods with their advantage and disadvantages , Integrated nematode management, Nematode management under protected cultivation, Nematode as biological models, Application of molecular techniques in Nematology.

9. PLANT PATHOLOGY

Landmarks and pioneers of plant pathology; theory of microscopy and staining; morphology of fungi,

bacteria, rickettsia's, phytoplasma and spiroplasma, viruses and viroids; principles of culturing and preservation of pathogens; characteristic symptoms; host-parasite relationships and its basis; symbiosis; economically important diseases of crop plants induced by fungi, bacteria, rickettsia's, phytoplasma and spiroplasma, viruses and viroids; phanerogamic parasites, non-parasitic diseases; nutrition, growth, reproduction, lifecycle, ultra-structure, genetics and classification of microorganisms; Molecular methods for detection and diagnosis of Pathogenic microbes like fungi, bacteria and viruses.; beneficial microorganisms including mycorrhiza; variation in phytopathogens and their ecology; introductory epidemiology. Principle of disease management, disease resistance, plant quarantine, seed and soil health. Disease forecasting. Important statistical designs; methods of their statistical analysis.

10. SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

Rocks and minerals; mineral weathering and soil formation; classification of soils, major soils of India; Soil texture, structure, soil water, soil temperature, soil air and their management, principal silicate structures; nature and properties of organic and inorganic constituents of soils, ion exchange phenomenon; activity of ions in soil system; fixation and release of nutrients. Soil fertility evaluation; movement of water; problematic soils, soil-related constraints in crop production and remedial measures, soil amendments; soil and water conservation; sampling and analytical procedures for soils, plants, water, manures, fertilizers and soil amendments; quality of irrigation water; fertilizer recommendations; soil organic matter, soil micro flora; carbon, nitrogen and phosphorus cycles; biofertilizers; phosphate solubilization; Darcy's law; Ficks law, steady and transient state diffusion in soils. Essential plant nutrients; manures; utilization of organic wastes and industrial by-products; fertilizers and their production, properties and usage; secondary and micronutrients. Microbial transformation of N, P, S, Fe & Mn; land capability classification, chemistry of submerged soil, soil & water pollution, fertilizer control order. Principles of experimental designs, analysis and interpretation ofdata, methods of statistical analysis and statistical designs

11. PLANT PHYSIOLOGY

Plant water relation; Diffusion, osmosis, transpiration and components of water potential. Photosynthesis; C_3, C_4 and CAM plants, factors affecting photosynthesis. Ner assimilation rate, concept of source and sink, partitioning. Respiration; Glycolysis, kreb cycle and ETC, factor affecting respiration. Nitrogen metabolism, Secondary metabolites and their significance in plant defense mechanism. Growth and differentiation and its hormonal concept, Plant growth hormons (auxins, gibberellins, cytokinins, ABA, ethylene, etc, synthetic growth regulators, growth retardant, apical dominance, senescence, fruit growth, abscission, photo-morphogenesis, photo–receptors, phytochrome, physiology of flowering, photoperiodism and vernalisation. Mineral nutrition; Importance in plant growth, classification and essentiality criteria. Abiotic stress responses in plants; Drought, high and low temperature stress, salinity stress. Seed physiology: structure, types of seeds, chemical composition. Plant Phenomics; phenotyping, applications and importance.

HORTICULTURE

1. FRUIT SCIENCE

Importance scope, area and production of fruits, classification of fruit crops, climatic and soil requirement, Recent trends in planting systems, cropping systems, rejuvenation, climatic requirement for fruit crops, improved varieties, principles of pruning and training, canopy management, nutrient management, fertigation, use of bio-fertilizers, weed control, water management, nursery management of fruit plants, modern methods of propagation including root stock and micro propagation, high density orcharding, use of growth regulators in fruit crops; biotic and abiotic factors limiting fruit production, physiology of flowering, pollination, fruit set and development, insect pest and diseases management, physiological disorders & it's

management. Cultivation practices of major fruit crops like mango, citrus, banana, grape, papaya, guava, pineapple, sapota, strawberry, litchi, loquat, phalsa, jackfruit, mangosteen, cashew nut, ber, pomegranate, date palm, aonla, wood apple, bael, custard apple and temperate fruits like apple, pear, peach, almond, plum, apricot and cherry. Arid fruit crops and underutilized fruit crops. Maturity indices, harvesting, pre-cooling, grading, packing methods and transport, methods of storage; ventilated, refrigerated, MAS, CA storage, physical injuries and disorders, physiology and biochemistry of fruit ripening, ripening techniques of fruit crops, major methods of preservation and processing of fruit crops. Biodiversity, germplasms conservation, gene centers, intellectual property rights of fruits crops. Role of photoperiod, vernalization, dormancy, respiration, transpiration, photosynthesis and senescence in plants. Essential plant nutrients and their uptake in fruit crops. Important statistical designs; methods of their statistical analysis.

2. VEGETABLE SCIENCE

Introduction, botany and taxonomy, climatic and soil requirements, commercial varieties/hybrids, sowing/planting times and methods, seed rate and seed treatment, nutritional and irrigation requirements, intercultural operations, weed control, mulching, physiological disorders, harvesting, post-harvest management, plant protection measures, economics of crop production and seed production of warm season vegetables (tomato, eggplant, hot and sweet peppers, okra, beans and cowpea, cucurbitaceous crops, tapioca and sweet potato, green leafy vegetables), cool season vegetables (potato, cabbage, cauliflower, knoll kohl, sprouting broccoli, brussels sprout, root crops: carrot, radish, turnip and beetroot. bulb crops: onion and garlic, peas and broad bean, green leafy vegetables), under exploited vegetables (Asparagus, artichoke and leek, brussels's sprout, chinese cabbage, broccoli, kale and artichoke, amaranth, celery, parsley, parsnip, lettuce, rhubarb, spinach, basella, bathu (chenopods) and chekurmanis. elephant foot yam, lima bean, winged bean, vegetable pigeon pea, jack bean and sword bean, sweet gourd, spine gourd, pointed gourd, oriental pickling melon and little gourd).

Introduction, importance of spice crops-historical accent, present status - national and international, future prospects, botany and taxonomy, climatic and soil requirements, commercial varieties/hybrids, site selection, layout, sowing/planting times and methods, seed rate and seed treatment, nutritional and irrigation requirements, intercropping, mixed cropping, intercultural operations, weed control, mulching, physiological disorders, harvesting, post-harvest management, plant protection measures and seed planting material and micro-propagation, precision farming, organic resource management, organic certification, quality control, pharmaceutical significance and protected cultivation of black pepper, cardamom, clove, cinnamon and nutmeg, allspice, turmeric, ginger and garlic, coriander, fenugreek, cumin, fennel, ajowain, dill. celery, tamarind, garcinia and vanilla.

Origin, botany, taxonomy, cytogenetics, genetics, breeding objectives, breeding methods (introduction, selection, hybridization, mutation), varieties and varietal characterization, resistance breeding for biotic and abiotic stress, quality improvement, molecular marker, genomics, marker assisted breeding and QTLs, biotechnology, issue of patenting, PPVFR act and their use in breeding in vegetable crops like Potato and tomato. Eggplant, hot pepper, sweet pepper and okra, Peas and beans, amaranth, chenopods and lettuce, Gourds, melons, pumpkins and squashes. Cabbage, cauliflower, carrot, beetroot, radish, sweet potato and tapioca.

Definition of seed and its quality, new seed policies; DUS test, scope of vegetable seed industry in India. Genetical and agronomical principles of seed production; methods of seed production; use of growth regulators and chemicals in vegetable seed production; floral biology, pollination, breeding behavior, seed development and maturation; methods of hybrid seed production. Categories of seed; maintenance of nucleus, foundation and certified seed; seed certification, seed standards; seed act and law enforcement, plant quarantine and quality control. Physiological maturity, seed harvesting, extraction, curing, drying, grading, seed processing, seed coating and pelleting, packaging (containers/packets), storage and cryopreservation of seeds, synthetic seed technology. Agro-techniques for seed production in solanaceous vegetables, cucurbits,

leguminous vegetables, cole crops, bulb crops, leafy vegetables, okra, vegetatively propagated vegetables.

3. FLORICULTURE AND LANDSCAPING

History, importance and scope of Floriculture and landscape gardening in India, commercial floriculture, cut flowers and loose flower production technology.

Breeding: Various breeding methods suitable for sexually and asexually propagated flower crops and ornamental plants for varietal development. Production of hybrids, male sterility, incompatibility problems in commercial flower crops. Breeding constrains and achievements made in ornamental plants. Introduction and selection of plants for waterscaping and xeriscaping.

Production Technology of cut flowers: Scope and importance of cut flowers in India, Global Scenario of cut flower production. Varietal wealth and diversity. Area under cut flowers and production problems in India. Protected cultivation technology of cut flower production with soil, media, water, nutritional and environmental parameters. Use of growth regulators, plant protection measures, Flowers forcing and year-round flowering through physiological interventions. Cut flowers standards, grades, harvesting indices, harvesting techniques, post-harvest handling, storage, various uses and marketing and exporting of cut flowers. Crops: Cut rose, chrysanthemum, carnation, gerbera, gladiolus, tuberose, orchids, anthurium, aster, lilies, birds of paradise, heliconia, alstroemeria, cut foliage, etc.

Production technology for loose flowers: Scope of loose flowers trade, Significance in the domestic/export market, varietal wealth and diversity. Propagation techniques, sexual and asexual propagation methods, Propagation in mist chambers, tissue culture, soil less media, advanced nursery technology, its management, pro-tray nursery under shade nets, transplanting techniques, precision farming techniques. Water and nutrient management, weed management, training and pruning, pinching, disbudding and special horticultural practices, use of growth regulator, physiological disorders, plant protection measures. Flower forcing and year-round flower production for special occasions through physiological interventions chemical regulation, harvesting, harvesting techniques, post-harvest handling and grading packing and storage, value edition, concrete and essential oil extraction, export potential of loose flowers, production technology for Jasmine, Scented rose, chrysanthemum, marigold, gaillardia, tuberose, crossandra and non-traditional flowers.

Landscaping: Landscape designs, styles of garden, formal informal and free style gardens, types Of gardens, English, Mughal, Japanese Persian, Spanish, Italian, Vanas, Buddha garden, urban landscaping, landscaping for specific situation like institutional, industrial, residential. public and private gardens, principles and special features of Landscape gardens, various plants and non-plant components of landscape gardens, arboretum, shrubbery, fernery, arches, and pergolas, edge, hedges, climbers, creepers. Annual flowers, shrubs, bonsai. Special types of gardens, vertical gardens, use and maintenance of garden machinery tools, Lawn establishment and maintenance.

Protected Floriculture: Protected floriculture in India. Types of protected structures, design, structural components, suitable flower crops for protected cultivation. Different systems used in protected cultivation. Factor and components of protected cultivation.

Value Addition and floral arrangement: Global scenario, production and export. Types of value-added products, flower arrangements, floral decorations, types and techniques.

HOME SCIENCE

1. FOOD SCIENCE AND NUTRITION/ FOOD AND NUTRITION

Overview of macro and micro nutrients; Basis of requirement, protein turn over, methods of assessing protein quality, Functions and role of dietary fibre in various physiological disorders. Chemistry, distribution, functions, absorption, transport, metabolism, deficiency manifestations, toxicity of vitamins and minerals; Sensory evaluation; Effect of cooking on their nutritive value of foods; Nutritional requirements during life

cycle; Therapeutic nutrition; Nutritional status at individual, household and institutional level; National nutritional programmes and policies; Nutritional surveillance; Food and nutrition security at national and household level; Food product development.

2. HUMAN DEVELOPMENT AND FAMILY STUDIES

Introduction to child/human development- meaning, concept, principles, prenatal development (conception to child birth), care of new born, pre-natal and post-natal care of mother, development of child in early and late childhood, adolescence, marriage and family dynamics, meaning, definition of family life cycle, family welfare programmes in India, child studies methods. Meaning, types and functions of theory, theoretical perspectives- biological, environmental, interactional and cultural; Integrated view of development from a life span perspective- recent research trends in human development issues. Gender issues in Human Development and Family Studies (socialization, family roles, responsibilities and family adjustment). Need, Importance and approaches for parent and community education. Types of developmentally challenged children and concept of special education, ethical issues in the assessment of human development. Guidance and counselling- concept, aims, need, nature and scope of guidance and counselling, Impact of aging on physical, psychological, socio-emotional aspects. Orientation to the supportive and substitutive services related to the welfare of families. Meaning area and scope of marital and family therapy.

3. EXTENSION EDUCATION AND COMMUNICATION MANAGEMENT

Extension efforts after independence :Community Development Programme; Panchayati Raj Institutions; Area and target oriented programme; Special programme for poor, women and children; ICAR research and extension systems- KVK, NATP, IVLP, ATIC, NAIP, AICRP; NITI Aayog; Extension Approaches to rural development; Communication skills; Development communication; Recent advances in communication- print and electronic ; e-Governance; Participatory planning; Project management techniques - PERT, CPM, SWOT analysis; Implementation, monitoring and evaluation of extension programme; SHGs; Types of training; Experiential Learning Cycle; Participatory training methods; Designing, management and delivery of training programme; HRD- concept and techniques; Role of multimedia in communication; Administration and management of extension organizations; Various formats of scientific communication.

4. TEXTILE AND APPAREL DESIGNING

Chemistry of polymers; Structure of textile fibres cotton, viscose rayon, silk, wool, linen, polyester, acrylic, spandex and minor fibres; action of heat, light, bleach and micro-organisms on different fibres; commercial processes of fibres, High performance fibres; Functions of ISI and other standards, National and international organizations for standards. Textile Quality Analysis - fibres, Yarn and Fabric testing; Shuttle less looms; Complex & fancy structures; Advanced techniques of pattern making and draping; Pattern grading and fitting; Government Textile & Clothing policies.

5. RESOURCE MANAGEMENT AND CONSUMER SCIENCE

Management-concept, system approach to management, motivating factors, motivation theories; Functions of management-planning, supervision, controlling, organizing, evaluation; Resources- classification, characteristics; Scientific Management; Biomechanics and application of biomechanics to movement; Ergonomics Tools and techniques to assess and control ergonomic hazards at work; Family dynamics, Human rights; Economic and psychological cost of gainful employment of women in the family; Significance of product design and need for creative approach; Globalization, Liberalization and Privatization- its impact on consumer behaviour; Consumer and protection; Characteristics and status of people with special needs; Management of natural resources; Sustainable development; Environment and health hazards; Entrepreneurship development.