Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya-224229

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Curriculum Addressing to Local and Regional Needs

U.G. Programme

HSOC-311 Introduction to Rural Sociology 2(2+0)

Theory:

Rural sociology- Meaning, scope and significance. Structural differentiation in terms of difference and characteristics of rural and urban societies. Planned social change - Approaches to rural planning, improvement and transformation and their shortcomings. Indian rural development programs (IRDPs). rural social stratification in Uttar Pradesh: Castes- Basic notions, changes and its role in economy and policy of Uttar Pradesh, difference between caste and class, backward classes and implementations of constitutional provisions. Indian rural institutions: Social- Family and marriage (Nature, forms and changes), Economic-political: Land relations and changes; rural poverty in Uttar Pradesh: its manifestations and causes. Socio-religious: Functional significance of beliefs, traditions and customs in Uttar Pradesh. Rural social changes - Processes and factors of transformation. Status of women in Uttar Pradesh and their role in rural and agricultural development of Uttar Pradesh.

HDFS-311 Family Counseling and Child Welfare 3(2+1)

Theory:

Concept, nature, scope, principles and need of family counselling, trust areas in family counselling- educational, vocational, social, personal, premarital and marital, problems in family counselling, methods of handling problems, approaches to evaluate family counselling, counselor's self-awareness and growth. Situation analysis of child, women, youth, elderly, disabled and reserved category in India and in the world- Census, Issues and challenged, determining factors for the present status, impact of present status on the family and society at large. Child welfare- definition, need, constitutional, provisions for children, legislations pertaining to children, schemes/projects and policies for children, other activities of child welfare, women welfare- definition, need, constitutional, provisions for women, legislations pertaining to women, schemes/projects and policies for women youth welfare- definition, need, constitutional provisions for youth, legislations pertaining to youth, schemes/projects and policies for youth elderly welfare- definition, need, constitutional, provisions for elderly,

legislations pertaining to elderly, schemes/projects and policies for elderly disabled/ exceptional pupil welfare- definition, need, constitutional, provisions for disabled, legislations pertaining to disabled, schemes/projects and policies for disabled reserved category welfare- definition, need, constitutional provisions for reserved category, legislations pertaining to reserved category, schemes/projects and policies for reserved category national and international organizations and agencies working for child, women, youth, elderly and disabled welfare: UNICEF, WHO, CARE, DWACRA, NIPCCD, CIF etc.
Schemes/projects and policies for child, women, youth, elderly and disabled welfare in eastern U.P. State and local organizations and agencies working for child, women, youth, elderly and disabled welfare.

Practical:

Visits to organizations offering counseling to families. studying the areas of family counseling, identifying the families which are in need of counseling, conducting counseling sessions to families, presentation of reports. Visits to various government and non- government organisations working for the welfare of the children, Presentation of reports.

HDFS-411 Methods and Materials for Teaching Young Children 4(0+4)

Practical:

Orientation on different methods and materials used for teaching young children. Survey of available different kinds of literature appropriate for infancy through early childhood. Visit to Organization and Children's libraries for development of literature, Reporting on different kinds of literature appropriate for infants and preschool children. Developing stories appropriate for infancy through early childhood- A Folk tale, A Fairy tales, A Personal story etc., Carry out discussions on developed stories, Collection and Observation of different techniques of story-telling. Identifying and analyzing the different techniques of story- telling, Practicing techniques of effective story-telling, Identifying methods of development of creativity -Analyzing situations/ conditions that foster creativity-Preparation of art file with different forms of paintings and printing appropriate for infancy through early childhood- Preparation of collage, murals and models appropriate for infancy through early childhood - Art activities (Painting and graphics, Tearing, cutting, pasting and collage, murals, modeling, printing, blocks, sand and mud, water)- preparation of each medium of art activity for young child's development, types/variations in art activities, identification of different types of creative expressions in young children- creating songs with music and rhythm movements appropriate for infancy through early childhood- making simple musical instruments with indigenous material- preparation of different types of puppets -practicing musical activities- learning basic manipulation skills: use of music, voice modulation and sound effects. Making sets and backgrounds- Identifying different types of creative dramas. Scripting for short puppet show and creative dramas, planning and implementing activities to promote creative expressions among young children through a variety of media i.e. painting, printing, modelling, cutting, pasting, blocks, puppetry, music movement, drama and language, Developing resource file, Organising an Exhibition and evaluation of materials developed. Collection of local poems and stories for young children. Identifying and analyzing story telling techniques in eastern

U.P. Development of Teaching Materials Young Children from local available material.

FSN-121 Food Science and Processing 4(3+1)

Theory:

Food groups, food guide pyramid and its importance, foods as a source of nutrients Objectives of cooking, processing, preservation, methods of cooking with their merits and demerits. Effect of cooking and heat on nutritive value of foods. Cereals, millets and pulses: Composition and nutritive value, types, storage, processing. Cereal cookery. Gluten and factors affecting the gluten formation, cereal starch, gelatinization, dextrinisation. Pulse cookery. Effect of cooking, factors affecting cooking quality, toxic constituents in pulses. Nuts and oilseeds- Composition and nutritive value, types, storage, oil extraction, processing, toxic constituents and role in cookery. Milk and milk products: Composition and nutritive value, properties, processing and packaging, effect of heat, acid, enzymes, microbes, processed and indigenous milk products and their quality, role in cookery. Eggs- Structure, composition and nutritive value, storage, evaluation of quality of egg, role of egg in cookery. Flesh foods- Structure, composition and nutritive value, types, storage, evaluation of quality and selection of meat, fish and poultry, methods of cooking, brief description of ageing, tenderization and curing. Vegetables and fruits. Composition and nutritive value, types, storage, selection, post-harvest changes, effect of processing, preservation and cooking on different pigments of both fruits and vegetables. Sugar and its products: Composition and nutritive value, type, function, properties, stages in sugar cookery, role of sugar in cookery. Fat and oils. Composition, nutritive value, types, role in cookery and importance in daily diet. Spices and herbs. Types and its use. Beverages and appetizers. Classification, use in everyday lives with special reference to tea, coffee, cocoa and alcoholic drinks. Leavening agents, classification and functions. Processed and convenience foods. Ready to eat foods, frozen foods, dehydrated foods, instant food mixes.

Practical:

Laboratory conduct and responsibilities; knowledge of different food stuffs in English, Hindi and local language. Terms used in cookery, weights and measures; identification and use of different kitchen items and equipments. Identification and listing of various food groups; market survey of processed and preserved foods. Cereal cookery. Preparation of plain rice (open and pressure cook), lime-rice, pulao, paratha, chapatti, upma and halwa. Pulse cookery. Preparation of plain dal, dal with green, pakoras, sambar. Preparation of cereal and pulse combined recipes-Idlis, adai. Nuts and oilseeds. Preparation of chikki, til ladoos, thandai, fish in mustard paste Milk cookery. Preparation of curd and paneer. Egg cookery. Selection of egg, preparation of boiled egg, scrambled egg, poached egg. Meat and fish cookery. Preparation of meat and fish based items. Fruits and vegetables cookery: Preparation of sauces, pickles, squash, chips. Sabjis and salad Sugar cookery. Preparation of fudge and fondent. Process of caramalization; demonstration of 1-thread and 2-thread consistency. Fats and oils. Preparation puris, cakes and biscuits. Appetizers. Preparation of red tea, white tea, coffee, egg .Visit of food industries. Standarization of traditional recipes of eastern U.P. like fara ,bati chokha, daal paratha, baigan Chokha, kachori , katari / kharda etc.

FPHN 211 Community Nutrition and Education 3(2+1)

Theory:

Malnutrition- Definition and causes, PEM, Marasmus, Kwasiorkor, vicious cycle of malnutrition. Assessment of nutritional status. Clinical signs and symptoms, nutritional anthropometry, biochemical tests, biophysical tests, diet survey methods. Major nutritional problems prevalent in India and the state of Protein energy malnutrition, anaemia, vitamin A deficiency, iodine deficiency disorders, obesity, hypertension, atherosclerosis, diabetes mellitus. National programmes and role of national and international agencies. In improving nutritional status of the community. Integrated Child Development Service (ICDS), supplementary Nutrition Program (SNP), Applied Nutrition Program (ANP), Mid Day Meal Program (MDMP), Vitamin A Prophylaxis Program, Anaemia Prophylaxis Programme. Food and Agricultural Organization (FAO), World Health Organization (WHO), United Nations Children's Fund (UNICEF), UNDP, CARE and other Voluntary and Government Agencies. Nutrition education- Objectives and methods, principles. Recent National Nutrition Programes, Scheme for adolescent girls (SAG), POSHAN ABHIYAN. Nutritional assessment of rural population /tribes of eastern Uttar Pradesh

Practical:

Assessment of nutritional status of an individual/community using anthropometry and dietary survey. A) Preparation of schedule B) Survey work C) Analysis of data D) Writing of report. Visit to local health centre to identify clinical signs and symptoms of nutritional problems. Identification of adulterants in common foods. Visit to an ICDS Block. Development of audio-visual aids- radio script; popular article; chart/posters leaf-lets etc. Planning, implementation and evaluation of nutrition education for a target group.

FSN -411 Diet and Nutrition Counseling 3(0+3)

Practical:

Planning and preparation of diets using exchange lists. Processes and technique of counseling Diet planning in fever and infection Diet planning in GI disorders Diarrhea, constipation, gastritis, ulcerative colitis Diet planning in liver disease. Diet formulation in diabetes millitus. Diet planning in heart diseases. Diet planning in kidney diseases Diet planning in food allergies and gout Diet modification for prevention and treatment of cancer Diet in trauma and burns. Diet in obesity and underweight. Diet for old age people. Setting up a unit for nutrition counseling. Role play exercises for counseling. Supervised counseling of patients/clients. Visit to hospitals with therapeutic kitchen setup. Diet planning for sports personnels. Utilization of millets like *Jowar* , *Bajra* and *Madua* for preparation of healthy food products.

FPHN-311 Food Hygiene and Sanitation 2(1+1)

Theory:

Meaning and Principle of food hygiene. Water Requirement and use, sources of water supply, water pollution, purification of water, portable water and its quality-Criteria and standards, hardness of water and its treatment, defluoridation of water. Food hygiene: Contamination of foods from various sources. Green plants and fruits, animals, sewage, soil, air and water and their health hazards. Food spoilage. Perishable, semi perishable and non perishable foods. Sanitary procedures for preparation, handling and storage of foods. Food poisoning caused by bacteria: *Salmonella, Staphylococcal poisoning, Botulinum, Clostridium perfringens and B.cerus*. Sources, incubation period, mechanism of action. Investigation of Food Poisoning,

prevention and control. Food Poisoning caused by agents other than microorganism. Poisonous plants, animals, chemicals, metals and pesticides etc.

Practical:

Identification of micro organism, preparation of slides, preparation of media. Collection of water samples. Testing of water for: (i) Physical quality (ii) Bacteriological quality. Survey of hygienic and sanitary condition in food shops/food vendors. Report writing. Microbial evaluation of Street foods common in rural and urban areas of Ayodhya district.

FPHN-221 Food Standards and Quality Control 3(2+1)

Theory:

Importance of quality control and assurance. Food laws and regulations. Prevention of Food Adulteration Act, Fruit Product Order, Agmark, Essential Commodity Act, Consumer Protection Act, Bureau of Indian Standards, Codex Standards. Specifications and application of food standards for raw materials and food products Food additives. Preservatives, coloring agents, antioxidants, emulsifying agents, leavening agents and stabilizing agents Various methods for the assessment of quality of different foods Selection of sensory panel and sensory evaluation of food products. Food safety, risks and hazards Assessment and prevention of food adulteration. Food packaging and packaging material.

Practical:

Sensory and nutritional evaluation of some finished products. Detection of adulterants and preservatives in products. Visit to food quality control lab at Lucknow city.

TSD-211 Techniques of Fabric Construction 3(1+2)

Theory:

History of weaving and looms Woven fabrics; simple woven structures and compound woven structures and characteristics of woven fabric Classification of looms on basis of mechanics, means of running loom, structure and means of weft insertion Parts of loom and loom accessories and their function Mechanism of weaving: primary, secondary and tertiary motions Basic weaves: Plain, twill and satin and their variations Complex weaves: extra yarn fabrics, pile fabrics, leno, damask and jacquard Knitting: Terminology and principle of knitting Knitting machine: Parts and their function and types of knitting machine Knitting stitches:plain, rib and purl and types of knit fabrics Macrame and crochet: Tools and materials. Manufacturing process of felt, properties and end uses

Practical:

Observation of fabric structures under magnifying glass Graphical representation of woven design Handloom and its parts Weaving calculations and yarn preparation for plain weave Setting of loom and weaving of plain weave fabric Knitting machine and its parts Sample preparation of different fabric constructions hand knitting; plain, rib, purl knots of macramé stitches of crochet manual felting. Product development by using knitting stitches and techniques prevalent in Eastern Uttar Pradesh . Development of functional accessories such as

mobile covers, pot holders, potli bags etc. to suit the local and regional needs of people of Eastern U.P.

TSD-221 Textile Finishes 2(1+1)

Theory:

Textile finishing: Definition and its importance Classification of textile finishes: Chemical, mechanical, temporary, permanent, durable, renewable, semi permanent, reactive and additive finishes Processes of removing impurities from fabrics: Scouring, desizing, degumming, carbonizing, souring Basic finishes that alter hand or texture: Fulling/milling, felting, singeing, stiffening, decatizing Surface finishes: Bleaching, delustering, calendering, beetling, napping, flocking, burnt out design, acid design, plisse design, tentering, shearing and brushing Functional finishes: Water proof and water repellent finish, shrinkage control, wrinkle resistance, anti-static finish, anti-microbial finish, durable press and flame retardant finish Dyes and pigments, classification of dyes Application of dyes: direct, acid, basic, vat, azoic, mordant, sulphur, reactive and disperse dyes Dyeing techniques and equipment: Solution dyeing, fibre dyeing; tow and stock dyeing, yarn dyeing; skein and package dyeing and piece dyeing Styles of printing: Direct, discharge and resist printing Printing methods and equipment: Block, screen, stencil, roller, heat transfer printing, tie and dye and batik

Practical:

Finishing of cotton fabric Scouring Bleaching Mercerization Tying and dyeing of cotton fabric with direct dye Fabric designing by batik technique with napthol dye Printing of cotton fabric using different methods Block Stencil Screen Heat transfer. Development of some valuable products such as wall hangings, cushion covers, bedsheet sets, table runners, table mats, ladies shirts, sarees etc. through locally available resources of Uttar Pradesh

AD-321 Traditional Textiles and Costumes of India 3(2+1)

Theory :

Traditional woven textiles of Indi History of woven textiles: Dacca muslin, Brocades, Calico Printing Traditional sareesof India Jamdani, Baluchari, Pochampalli, Patola and Ikat, Kanjivaram, Chanderi, Maheshwari,Bomkai, Sambhalpuri, Vichitrapuri, Paithani, Kota Doria, Gadwal, Irkal, Venkatagiri, Narayanpet, Kasavu, Tanchoi and Brocade Sarees. Traditional woven and embroidered shawls of India: Shawls of Kashmir, Himachal Pradesh, Gujarat, North Eastern States and other states. Printed and painted textiles Printed textiles Block printed textiles: Dabuprinting, Bagruprinting, Sanganeriprinting, Bagh printing Tie and dyed textiles of Rajasthan and Gujarat. Painted textiles: Kalamkari, Madhubani, Warli, Patchitra, Phad and Pichhavai. Embroideries of different states of India: Kashida of Kashmir, ChambaRumal, Chikankari and Zari work of Uttar Pradesh, Phulkari and Bagh of Punjab, Embroideries of Gujarat, Kantha of Bengal, Manipuri Embroidery, Kasuti of Karnataka, Embroidery and Rabari work of Bihar, Pipli work of Orissa Importance of traditional textiles in textile and apparel industry Importance and market scenario of traditional Indian textiles and their impact on modern textiles industry. Geographical Indications obtained for traditional Indian textiles

Practical:

Documentation of motifs of traditional Indian embroideries. Sample preparation of traditional Indian embroideries Documentation of woven textiles of India. Creative projects in the adaptation of traditional motifs and designs in contemporary textiles through collection of samples, sketches and development of scrap book Visit to museum and art galleries. Development of products using any regional embroidery of Uttar Pradesh.

FRMCS-412 Interior Design and Decoration 3(0+3)

Practical:

Application of elements and principles of interior design and Decoration Preparation of utility and decoration articles by using various painting/printing techniques Calligraphy Use of floor decoration in interiors Flower arrangement and decoration for different areas and occasions. Stationery designs; cover designs for books, magazines, illustrations, lettering construction etc.Accessories; various types, materials and techniques; pottery, collage, handicrafts, utility articles, Paper mache items, paper sculpture, poster making, greeting cards, fabric painting, glass painting, gift wrapping etc. Participate in some workshops of handicraft with professionals such as bangle decoration, pot decoration and flawer decorators etc.

FRMCS-121 System Dynamics and Management of Resources 2(1+1)

Theory:

Systems approach to management. Motivating factors of management- valueas, goals and standards, origin, classification and role , Resources – definition, types , guidelines for use of resources and factors affecting, management of household resources and situation, Management process- planning - importance, types, characteristics and techniques, organizing; controlling definition, phases and factors, evaluating- definition and types of evaluating. Time - tools of time management, and process of time management. Decision making process - types, steps in decision making and factors affecting decion making. Money - management process, types and sources of income, steps in making budget, controlling budget and evaluation of budget.

Practical :

Goals of individual and family. Standards for individual and family goals. Decision making by individuals and families. Applying decision making process, group work presentation on types of decision and decision making process. Listing out human and non – human resources, listing community resources. Application of management process to organize an event – planning, organization, evaluation. Management of personal time record for a week. Presentation of personal time record. Preparing budget plans for different income group families. Identification of individual and family values, identification of immediate, short term and long term.

HECM -111 Extension and Rural Development 2 (2+0)

Theory:

Extension Education- concept and importance, philosophy, principles and objectives. Evolution of extension education- glimpses of pre- and post-independence era. Community: Meaning and definition, types of communities, community and science, community mobilization, leadership, participation-PRA. Community development programmes- concept,

objectives, organization, activities, achievement and failures. Sociology and Rural Sociology- meaning, scope, importance, concepts-structural and functional, differences between rural, urban and tribal societies. Rural development- concept, need, meaning, aim and functions of extension education for rural development. Rural development organizations in India; NABARD, KVIC, Ministry of Rural Development, Centre of Science and Technology for rural development. Panchayati Raj Institutions- concept, structure and function. Five year plans. NITI Aayog.

Current rural development programmes specific to eastern Uttar Pradesh, National Skill Mission, UP Lohia Gramin Awas Yojana, Pradhan Mantra Gram Sadak Yojana, UP Mukhyamantri Swarojgar yojana, Matrabhumi Yojana, National Rural Health Mission etc., DWMA, ATMA, ITDA, DRDA, KGMV. Role of ICAR, SAUs, KVKs, DAATTCs and NGOs in rural development.

HECM 212 Programme Development for Rural Families 3(1+2)

Theory:

Planning: nature of planning. Extension programme planning: concept, definition, objectives, principles relevant terms used in programme planning : situation, aims, objectives, problem, solution, project, plan, plan of work, calendar of work etc. Steps in extension programme planning: elaborate discussion. Critical analysis of few major development programmes under five-year plans. Leader and leadership: meaning, definition, identification of leader execution of programme: Environment and rapport building, role of local leader, involvement of local leaders, involvement of local bodies, organizations and extension agencies. Implementation of programme and constraints associated with it. Monitoring and evaluation: concept, meaning, definition.

Practical:

Establishing rapport with rural families and identification of leader in villages of Ayodhya. Conducting baseline survey of village and household and analysis of information. Different PRA tools, its applications in programme development and exercises. Triangulation of information from conventional and PRA method. Preparation of detailed plan of work for small need based programme specific to rural people of eastern UP. Implementation of programme. Evaluation of training programmes conducted by KVK in Ayodhya. Documentation Presentation of findings of programme.

FS-111(H) Fundamentals of Horticulture 3(2+1)

Theory:

Orchard &estate management, importance, objectives, merits and demerits, clean cultivation, sod culture, Sod mulch, herbicides and inorganic and organic mulches. Tropical, sub-tropical and temperate horticultural systems, competitive and complimentary effect of root and shoot systems. Biological efficiency of cropping systems in horticulture, systems of irrigation. Soil management in relation to nutrient and water uptake and their effect on soil environment, moisture, organisms and soil properties. Factors influencing the fruitfulness and unfruitfulness. Rejuvenation of old orchards, top working, frame working, Integrated nutrient and pest management. Utilization of resources constraints in existing systems. Crop model and

crop regulation in relation to cropping systems. Climate aberrations and mitigation measures of Horticultural crops. Soil moisture conservation techniques for sodic soil and rainfed condition of eastern part of Uttar Pradesh. Suitable irrigation systems and water management systems for local region of the University.

Practical:

Layout of different systems of orchard and estate, soil management, clean, inter, cover and mixed cropping, fillers. Use of mulch materials, organic and inorganic, moisture conservation, weed control. Layout of various irrigation systems. Irrigation systems, soil conservation and soil alkalinity management techniques for subtropical climate of Ayodhya District of Uttar Pradesh.

FS-121 (H)- Tropical and Sub-Tropical Fruits 3(2+1)

Theory:

Horticultural classification of fruits including genome classification. Horticultural zones of India, detailed study of area, production and export potential, varieties, climate and soil requirements, propagation techniques, planting density and systems, after care, training and pruning. Management of water, nutrient and weeds, special horticultural techniques including plant growth regulators, their solution preparation and use in commercial orchards. Physiological disorders. Post-harvest technology, harvest indices, harvesting methods, grading, packaging and storage of the following crops. Mango, banana, grapes, citrus, papaya, sapota, guava, pomegranate, bael,ber, amla, anona, fig, pineapple, jackfruit, avocado, mangosteen, litchi, carambola, durian, rambutan, bilimbi, loquat, rose apple breadfruit and passion fruit. Bearing in mango and citrus, causes and control measures of special production problems, alternate and irregular bearing overcome, control measures. Seediness and kokkan disease in banana, citrus decline and casual factors and their management. Bud forecasting in grapes, sex expression and seed production in papaya, latex extraction and crude papain production, economic of production. Especially emphasis on varieties, high-density planting, intercropping systems for ber, bael, anola, phalsa, Karonda, jamun and annona under the condition of eastern Uttar Pradesh.

Practical:

Description and identification of varieties based on flower and fruit morphology in above crops. Training and pruning of grapes, mango, guava and citrus. Selection of site and planting system, pre-treatment of banana suckers, desuckering in banana, sex forms in papaya. Use of plastics in fruit production. Visit to commercial orchards and diagnosis of maladies. Manure and fertilizer application including bio-fertilizer in fruit crops, preparation and application of growth regulators in banana, grapes and mango. Seed production in papaya, latex extraction and preparation of crude papain. Ripening of fruits, grading and packaging, production economics for tropical and sub-tropical fruits. Mapping of arid and semi-arid zones of India. Botanical description and identification of ber, fig, jamun, pomegranate, carissa, phalsa, wood apple, West Indian cherry, tamarind, aonla, bael and annona. Soil conservation and soil alkalinity management techniques for the region of eastern Uttar Pradesh.

VS-121(H) Tropical and Sub-tropical Vegetable Crops 3(2+1)

Theory:

Area, production, economic importance and export potential of tropical and sub-tropical vegetable crops. Description of varieties and hybrid, climate and soil requirements, seed rate, preparation of field, nursery practices; transplanting of vegetable crops and planting for directly sown/transplanted vegetable crops. Spacing, planting systems, water and weed management; nutrient management and deficiencies, use of chemicals and growth regulators. Cropping systems, harvest, yield, post-harvest handling, economics and marketing of tropical and sub-tropical vegetable crops such as tomato, brinjal, chillies, capsicum, okra, amaranthus, cluster beans, cowpea, lab-lab, snap bean, cucurbits, moringa, curry leaf, portulaca, basella, sorrel and roselle. Suitable vegetable crops with varieties for sodic soil and rainfed areas of eastern Uttar Pradesh

Practical:

Identification and description of tropical and sub-tropical vegetable crops; nursery practices and transplanting, preparation of field and sowing/planting for direct sown and planted vegetable crops. Herbicide use in vegetable culture; top dressing of fertilizers and intercultural; use of growth regulators; identification of nutrient deficiencies. Physiological disorder. Harvest indices and maturity standards, post-harvest handling and storage, marketing, seed extraction (cost of cultivation for tropical and sub-tropical vegetable crops), project preparation for commercial cultivation. Soil moisture conservation, irrigation systems and soil alkalinity management techniques for vegetables production of eastern part of Uttar Pradesh.

FS-122(H)- Plant Propagation and Nursery Management 2(1+1)

Theory:

Propagation: Need and potentialities for plant multiplication, sexual and asexual methods of propagation, advantages and disadvantages. Seed dormancy types of dormancy (scarification & stratification) internal and external factors, nursery techniques nursery management, apomixes – mono-embrony, polyembrony, chimera& bud sport. Propagation Structures: Mist chamber, humidifiers, greenhouses, glasshouses, cold frames, hot beds, poly-houses, phytotrons nursery (tools and implements), use of growth regulators in seed, types and stages of seed germination with examples and vegetative propagation, methods and techniques of division-stolons, pseudobulbs, offsets, runners, cutting, layering, grafting, formation of graft union, factor affecting, healing of graftageand budding physiological & bio chemical basis of rooting, factors influencing rooting of cuttings and layering, graft incompatibility. Anatomical studies of bud union, selection and maintenance of mother trees, collection of scion wood stick, scion-stock relationship, and their influences, bud wood certification, techniques of propagation through specialized organs, corm, runners, suckers. Micrografting, meristem culture, callus culture, anther culture, organogenesis, somaclonal variation hardening of plants in nurseries. Nursery registration act. Insect/pest/disease control in nursery, Cost of establishment of propagation structures. Suitable plant propagation techniques for horticultural crops with the time of propagation in the condition of sodic soil and rainfed areas of eastern Uttar Pradesh.

Practical:

Media for propagation of plants in nursery beds, potting and repotting. Preparation of nursery beds and sowing of seeds. Raising of rootstock. Seed treatments for breaking dormancy and inducing vigorous seedling growth. Preparation of plant material for potting. Hardening plants in the nursery. Practicing different types of cuttings, layering, graftings and buddings including opacity and grafting, top grafting and bridge grafting etc. Use of mist chamber in propagation

and hardening of plants. Preparation of plant growth regulators for seed germination and vegetative propagation. Visit to a tissue culture laboratory. Digging, labelling and packing of nursery fruit plants. Maintenance of nursery records. Use of different types of nursery tools and implements for general nursery and virus tested plant material in the nursery. Cost of establishment of a mist chamber, greenhouse, glasshouse, polyhouse and their maintenance. Nutrient and plant protection applications during nursery. Suitable plant propagation techniques for crops with the time of propagation in the condition of sodic soil and rainfed areas of eastern Uttar Pradesh.

FS-211(H)- Temperate Fruit Crops 2 (1+1)

Theory:

Classification of temperate fruits, detailed study of areas, production, varieties, climate and soil requirements, propagation, planting density, cropping systems, after care training and pruning, self-incompatibility and pollinisers, use of growth regulators, nutrient and weed management, harvesting, post-harvest handling and storage of apple, pear, peach, apricot, plum, cherry, persimmon, strawberry, kiwi, Queens land nut (Mecademia nut), almond, walnut, pecan nut, hazel nut and chest nut. Re-plant problem, rejuvenation and special production problems like pre-mature leaf fall, physiological disorders, important insect – pests and diseases and their control measures. Special production problems like alternate bearing problem and their remedies. Low chilling varieties, rootstocks, training and pruning systems of different temperate fruit crops under the subtropical condition of Eastern Uttar Pradesh.

Practical:

Nursery management practices, description and identification of varieties of above crops, manuring and fertilization, planting systems, preparation and use of growth regulators, training and pruning in apple, pear, plum, peach and nut crops. Visit to private orchards to diagnose maladies. Working out economics for apple, pear, plum and peach. Propagation methods and training systems of different temperate fruit crops under the subtropical condition of Eastern Uttar Pradesh.

SWCE-221 Watershed Hydrology 2(1+1)

Theory:

Hydrologic cycle, precipitation and its forms, rainfall measurement and estimation of mean rainfall in local areas, frequency analysis of point rainfall. Mass curve, hyetograph, depth-area-duration curves and intensity-duration-frequency relationship. Hydrologic processes Interception infiltration-factors influencing, measurement and indices. Evaporation - Estimation and measurement. Runoff -factors affecting, measurement, stage - discharge rating curve, estimation of peak runoff rate and volume, Rational method, Cook's method and SCS curve number method. Geomorphology of watersheds – Linear, aerial and relief aspects of watersheds- stream order, drainage density and stream frequency. Hydrograph - Components, base flow separation, unit hydrograph theory, S-curve, synthetic hydrograph, applications and limitations. Stream gauging discharge rating curves, flood peak, design flood and computation of probable flood. Flood routing – channel and reservoir routing. Drought – classification, causes and impacts, drought management strategy.

Practical:

Visit to meteorological observatory and study of different instruments. Design of rain gauge network. Exercise on intensity - frequency - duration curves. Exercise on depth - area – duration and double mass curves. Analysis of rainfall data and estimation of mean rainfall by different methods. Exercise on frequency analysis of hydrologic data and estimation of missing data, test for consistency of rainfall records. Exercise on computation of infiltration indices. Computation of peak runoff and runoff volume by Cook's method and rational formula. Computation of runoff volume by SCS curve number method. Study of stream gauging instruments - current meter and stage level recorder. Exercise on geomorphic parameters of watersheds. Exercise on runoff hydrograph. Exercise on unit hydrograph. Exercise on synthetic hydrograph. Exercise on flood routing. Study and Analysis of rainfall data of districts of eastern UP., delineation and prioritization of *Saryu* and *Tamsa* river basin of eastern UP

P.G. Programme

HDFS- 503 Gender Issues in Human Development and Family Relations 3(2+1)

Theory:

UNIT I: Concept of gender- its biological and socio-cultural connotations. Importance of gender differences in human development. Gender theories- gender orientation theory of Sandra Bem, gender schema theory, theory of ego development and gender.

UNIT II: Demographic challenges to family ecology, gender issues in family involvement and cohesiveness (socialization, family roles, responsibilities and family adjustment) impact of gender roles, responsibilities and socialization practices. Gender issues related to eastern U.P.

UNIT III: Working towards family solidarity and social wellbeing (values and ethics in the promotion of happy family life).

UNIT IV: Changing trends in gender role orientation, its socio- economic and cultural impact on the family and society.

Practical: Gender analysis of mass media content, books, television and films. Interviewing children and parents to study gender socialization practices. Administering gender role orientation scale to adolescents /women interpreting the results. Case study of three generation families to identify the differences in the gender orientation roles and responsibilities. Case studies for gender role performance. Case study on Demographic challenges of family ecology in eastern U.P. Study on the experiences of young women related to gender inequality in eastern U.P.

FN 523 Advanced Diet Therapy 3(2+1)

Theory:

UNIT I: Role of dietician in a health care team in hospital and community. Newer concepts in dietary management of various nutritional disorders and disease conditions: fevers, infections.

UNIT II: Dietary management gastro intesintestinal & liver diseases

UNIT III: Dietary management of cardiovascular diseases, renal disorders and obesity,

UNIT IV: Dietary management of diabetes, cancer and HIV. Nutrition in critical care.

Practical:

Formulation of food exchanges. Therapeutic modifications of diet in terms of nutrients,

consistency and composition for various disorders and diseases. Preparation of SOAP notes and case studies. Visit to hospitals to acquire knowledge about prevalent diseases and disorders in eastern U.P.

FN -521 Advances in Community Nutrition 3 (1+2)

Theory:

UNIT I Assessment of the nutritional status at individual, household and institutional level: direct and indirect methods. UNIT II Ecological, socio-cultural, economic and demographic correlations of malnutrition; prevalence, etiology, biochemical and metabolic changes in vitamin A deficiency, PEM, iron deficiency anemia, IDD. UNIT III Major nutritional problems of the state, nation and world. Nutrition intervention- Definition, importance, methods of nutrition intervention and their impact evaluation. UNIT IV National nutritional programmes and policies; nutritional surveillance. National programmes and policies regarding food production and distribution.

Practical :

Market survey for food availability and their cost; development of low-cost nutritious recipes suitable for various vulnerable groups; visit to the ongoing public health nutrition programme and report writing; Techniques of assessment of nutritional status. Studying existing diet and nutrition practices, planning and conducting survey, analyzing data and writing report; development, implementation and evaluation of community nutrition and health programmes. Survey of major nutritional problems of U.P.

FRM -512 Advanced Interior Space Management 3(2+1)

Theory:

UNIT I Effect of interior design and decoration on family well-being with particular reference to special needs - Functional and aesthetic considerations in use of elements and principles of design. UNIT II Advances in design process of residential and commercial interiors. UNIT III Trends in decoration treatments for interiors and interior backgrounds from past to present: furniture, furnishings, lighting, fittings and fixtures, surface materials, finishes.

UNIT IV Changing trends in thermal, acoustics and safety mechanisms. Solutions for problem areas in residential and commercial building interiors.

Practical :

Critical analysis of interiors of a selected residential and non-residential buildings and suggested improvements – Visits to building design institutes, hotels, furniture and furnishing show rooms and residential buildings to identify new trends – Market survey of surface materials, finishes, fittings and fixtures – Detailed cost estimation of interior design and decoration elements. Designing interior and exterior for pot gardening in residential houses.

FRM -516 Colour and Lighting in Interiors 3(2+1)

Theory:

UNIT I Fundamentals of colour and light in interior environments – Theory of colour and light as perceived by the human eye.

UNIT II Colour: properties, systems, mixing, symbolism, cultural effects and psychology – Physical and perceptual aspects of colour and lighting – Need for colour and lighting to provide comfort and adequate safety – Need for quality in the selection of colours and lighting in the built environment.
UNIT III Concepts of lighting - Safety and emergency lighting.
UNIT IV Effects of colour on people, use of colour and light in interior in relation to function, materials, surface finish and colour scheme integration, Visual tricks to play – space making, space shrinking, camouflage and disguise

Practical:

Evolving Munsell and Ostwald colour wheels – Colour schemes for problem areas in residential and non-residential interiors – Studying the psychological and emotional effects of colours in interiors – Influence of light on colour in simulated conditions. Preparation of different lighting fixtures for festivals to enrich interior decoration.

FSC 521 Subtropical and Temperate Fruit Production 3(2+1)

Theory:

Commercial varieties of regional, national and international importance, ecophysiological requirements, recent trends in propagation, rootstock influence, planting systems, cropping systems, root zone and canopy management, nutrient management, water management, fertigation, bioregulation, abiotic factors limiting fruit production, physiology of flowering, fruit set and development, abiotic factors limiting production, physiological disorders-causes and remedies, quality improvement by management practices; maturity indices, harvesting, grading, packing, precooling, storage, transportation and ripening techniques; industrial and export potential, Agri Export Zones(AEZ) and industrial support. Low chilling varieties, rootstocks, training and pruning systems of different temperate fruit crops under the subtropical condition of Eastern Uttar Pradesh.

Crops
UNIT I: Apple, pear, quince, grapes
UNIT II: Plums, peach, apricot, cherries, hazelnut
UNIT III: Litchi, loquat, persimmon, kiwifruit, strawberry
UNIT IV: Nuts- walnut, almond, pistachio, pecan
UNIT V: Minor fruits- mangosteen, carambola, bael, wood apple, fig, jamun, rambutan, pomegranate, Anola, Ber, Phalsa, Karonda, Annona, cape gooseberry, Tamarind, chironji, barbados cherry

Practical:

Identification of important cultivars, observations on growth and development, practices in growth regulation, malady diagnosis, analyses of quality attributes, visit to tropical, subtropical, humid tropical and temperate orchards, Project preparation for establishing commercial orchards. Propagation methods and training systems of different temperate fruit crops under the subtropical condition of Eastern Uttar Pradesh.

FSC 522 Breeding of Fruit Crops 3(2+1)

Theory:

Origin and distribution, taxonomical status - species and cultivars, cytogenetics, genetic resources, blossom biology, breeding systems, breeding objectives, ideotypes, approaches for

crop improvement - introduction, selection, hybridization, mutation breeding, polyploidy breeding, rootstock breeding, improvement of quality traits, resistance breeding for biotic and abiotic stresses, biotechnological interventions, achievements and future thrust in the following selected fruit crops. Classification and characterization of suitable varieties of minor fruit crops for sodic soil and rainfed condition of eastern region of Uttar Pradesh.

Crops
UNIT I: Mango, banana and pineapple
UNIT II: Citrus, grapes, guava and sapota
UNIT III: Jackfruit, papaya, custard apple, aonla, avocado and ber
UNIT IV: Mangosteen, litchi, jamun, phalsa, mulberry, raspberry, kokam and nuts
UNIT V: Apple, pear, plums, peach, apricot, cherries and strawberry
Practical:

Characterization of germplasm, blossom biology, study of anthesis, estimating fertility status, practices in hybridization, ploidy breeding, mutation breeding, evaluation of biometrical traits and quality traits, screening for resistance, developing breeding programme for specific traits, visit to research stations working on tropical, subtropical and temperate fruit improvement Research programme for crop improvement of minor fruit crops of eastern part of Uttar Pradesh.

FSC 525 Post Harvest Technology for Fruit Crops 3(2+1)

Theory:

UNIT I: Maturity indices, harvesting practices for specific market requirements, influence of pre-harvest practices, enzymatic and textural changes, respiration, and transpiration.
UNIT II: Physiology and biochemistry of fruit ripening, ethylene evolution and ethylene management, factors leading to post-harvest loss, pre-cooling.
UNIT III: Treatments prior to shipment, viz., chlorination, waxing, chemicals, bio control agents and natural plant products. Methods of storage ventilated, refrigerated, MAS, CA storage, physical injuries and disorders.
UNIT IV: Packing methods and transport, principles and methods of preservation, food processing, canning, fruit juices, beverages, pickles, jam, jellies, candies.
UNIT V: Dried and dehydrated products, nutritionally enriched products, fermented fruit beverages, packaging technology, processing waste management, food safety standards.
UNIT IV: Post-harvest technologies and post-harvest losses effect on especially emphasis with crops of ber, bael, anola, phalsa, karonda, jamun, phalsa, annona etc. under the condition of eastern Uttar Pradesh.

Practical:

Analyzing maturity stages of commercially important horticultural crops, improved packing and storage of important horticultural commodities, physiological loss in weight of fruits and vegetables, estimation of transpiration, respiration rate, ethylene release and study of vase lifeextension in cut flower using chemicals, estimation of quality characteristics in stored fruits and vegetables, cold chain management -visit to cold storage and CA storage units, visit to fruit and vegetable processing units, project preparation, evaluation of processed horticultural products. Study of post-harvest technologies for processed products and post-harvest losses of ber, bael, anola, phalsa, karonda, jamun, phalsa, annona etc. under the region of eastern part of Uttar Pradesh.

VSC- 511 Production Technology of Warm Season Vegetable Crops 3(2+1)

Theory:

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, postharvest management, plant protection measures, economics of crop production and seed production. Production technologies, suitable crops and their varieties, irrigation systems, water management, soil moisture conservation techniques, insect, pest and disease management for warm season vegetable crops under the subtropical condition of Eastern Uttar Pradesh.

UNIT I: Tomato, eggplant, hot and sweet peppers
UNIT II: Okra, beans, cowpea and cluster bean
UNIT III: Cucurbitaceous crops
UNIT IV: Tapioca and sweet potato
UNIT V: Green leafy warm season vegetables

Practical:

Cultural operations (fertilizer application, sowing, mulching, irrigation, weed control) of summer vegetable crops and their economics; study of physiological disorders and deficiency of mineral elements, preparation of cropping schemes for commercial farms; experiments to demonstrate the role of mineral elements, physiological disorders; plant growth substances and herbicides; seed extraction techniques; identification of important pests and diseases and their control; maturity standards; economics of warm season vegetable crops. Characterization of suitable varieties of vegetable crops for warm season crops of sodic soil and rainfed condition of eastern region of Uttar Pradesh.

VSC-512 Breeding of Vegetable Crops 3(2+1)

Theory:

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 and their use in breeding in vegetable crops-Issue of patenting, PPVFR act. Classification and characterization of suitable varieties of vegetable crops for sodic soil and rainfed condition of eastern region of Uttar Pradesh.

UNIT I:Potato and tomato
UNIT II:Eggplant, hot pepper, sweet pepper and okra
UNIT III:Peas and beans, amaranth, chenopods and lettuce
UNIT IV:Gourds, melons, pumpkins and squashes
UNIT V: Cabbage, cauliflower, carrot, beetroot, radish, sweet potato and tapioca

Practical:

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, palanological studies, 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. Visit to breeding blocks. Study of crop improvement techniques of vegetable crops of eastern part of Uttar Pradesh.

AF 513 Crops and Animals Production Management in Agroforestry 3(2+1)

Theory:

UNIT I: Choice of inter-crops for different tree species, sowing and planting techniques. Planting patterns, crop geometry, nutrient requirements, and weed management. Management of fodder tree species, thinning, lopping, pruning. Ecological and socio-economic interactions.
UNIT II: Role of tree architecture and its management on system's productivity. Production potentials of fodder based agroforestry system in different agro climatic conditions. Crop combination, crop combination interactions in crop mixtures. Importance of cattle–sheep and goat vis-à-vis agro-forestry systems. Feed and fodder resources in agro-forestry systems and live stock management.
UNIT III: Nutrient analysis of forages derived from fodder trees/shrubs. Nutrient requirement for various livestock and their ration computation with agroforestry forages and tree leaves. Forage and tree leaves preservation.
UNIT IV: Calendars for forage crop production in agro-forestry systems including lopping schedules. Optimization of animal production. Animal products technology and marketing.
UNIT V: Integrated Agroforestry Farming System. Suitable horticultural crops with agroforestry systems for higher production and quality feed and fodders for animals in the region of eastern part of Uttar Pradesh.

Practical:

Measurement of crop growth rates. Study of tree crop association and management methods. Quantitative evaluation of tree-crop, livestock. Analysis of forages and feeds for mineral and incrementing constituents. Digestibility of some agro-forestry forages. Preparation of leaf meal and forage conservation. Familiarity with common veterinary instruments, equipment's and common feeds and fodders & Field visits. Study of horticultural crops with agroforestry systems for higher production and quality feed and fodders for animals in the region of eastern part of Uttar Pradesh.

FSC-611 Advances in Breeding of Fruit Crops 3(2+1)

Theory:

Evolutionary mechanisms, adaptation and domestication, Genetic resources, cytogenetics, cytomorphology, chemotaxonomy, genetics of important traits and their inheritance pattern, variations and natural selection, spontaneous mutations, incompatibility systems in fruits, recent advances in crop improvement efforts- introduction and selection, chimeras, apomixis, clonal selections, intergeneric, interspecific and intervarietal hybridization, mutation and polyploid breeding, resistance breeding to biotic and abiotic stresses, breeding for improving quality, molecular and transgenic approaches in improvement of selected fruit crops. Classification and characterization of suitable varieties of fruit crops for sodic soil and rainfed condition of region of Uttar Pradesh.

Crops

UNIT I : Mango and banana

UNIT II: Papaya, grapes and citrus

UNIT III: Guava and sapota

UNIT IV: Pineapple and avocado

UNIT V: Apple, pear, plums, peaches, apricot, cherries and strawberry

UNIT VI: Anola, Bael, Ber, Karonda, Jamun, Phalsa etc.

Practical:

Description and cataloguing of germplasm, pollen viability tests, pollen germination-isozyme techniques-survey and clonal selection, observations on pest, disease and stress reactions in inbreds and hybrids, use of mutagenes and colchicine for inducing mutation and ploidy changes, practices in different methods of breeding fruit crops and in-vitro breeding techniques. Study of crop improvement techniques for higher production and productive varieties of minor fruit crops of eastern region of Uttar Pradesh.

FSC-612 Advances In Production of Fruit Crops 3(2+1)

Theory:

National and International scenario in fruit production, Recent advances in propagation - root stock influence, planting systems, High density planting, crop modeling , Precision farming, decision support systems - aspects of crop regulation- physical and chemical regulation effects on physiology and development, influence of stress factors, strategies to overcome stress effects, integrated and modern approaches in water and nutrient management, , Total quality management(TQM) - Current topics. Fruit crop production technologies, suitable crop with varieties, biotic and abiotic stress management methods for the eastern part of Uttar Pradesh.

Crops

UNIT I : Mango and banana

UNIT II: Papaya, grapes and citrus

UNIT III: Guava, sapota, pomegranate and aonla

UNIT IV: Pineapple, avocado, jack fruit and fig

UNIT V: Apple, pear, plums, strawberry, peach, apricot, cherries and nut crops

UNIT VI: Anola, Ber, Bael, Phalsa, Jamun, Karonda etc.

Practical:

Survey of existing fruit cropping systems and development of a model cropping system, Estimating nutrient deficiency- estimation of water use efficiency, soil test-crop response correlations, practices in plant growth regulation, studying physiological and biochemical responses, quality analysis. Study of crop production techniques for suitable fruit crops under the region of Uttar Pradesh.

VSC 611 Advances in Vegetable Production 3(2+1)

Theory:

Present status and prospects of vegetable cultivation; nutritional and medicinal values; climate and soil as critical factors in vegetable production; choice of varieties; nursery management; modern concepts in water and weed management; physiological basis of growth, yield and

quality as influenced by chemicals and growth regulators; role of organic manures, inorganic fertilizers, micronutrients and biofertilizers; response of genotypes to low and high nutrient management, nutritional deficiencies, disorders and correction methods; different cropping systems; mulching; containerized culture for year round vegetable production; low cost polyhouse; net house production; crop modeling, organic gardening; vegetable production for pigments, export and processing. Suitable vegetable crops production technologies, varieties, inter cropping systems, water management systems, biotic and abiotic stress management systems for sodic soil and rainfed regions of Uttar Pradesh.

UNIT I: Tomato, brinjal, chilli, sweet pepper and potato
UNIT II: Cucurbits, cabbage, cauliflower and knol-khol
UNIT III:Bhendi, onion, peas and beans, amaranthus and drumstick
UNIT IV: Carrot, beet root and radish
UNIT V: Sweet potato, tapioca, elephant foot yam and taro
Practical:

Seed hardening treatments; practices in indeterminate and determinate vegetable growing and organic gardening; portrays and ball culture; diagnosis of nutritional and physiological disorders; analysis of physiological factors like anatomy; photosynthesis; light intensity in different cropping situation; assessing nutrient status, use of plant growth regulators; practices in herbicide application; estimating water requirements in relation to crop growth stages, maturity indices; dryland techniques for rainfed vegetable production; production constraints; analysis of different cropping system in various situation like cold and hot set; vegetable waste recycling management; quality analysis ;marketing survey of the above crops; visit to vegetable and fruit malls and packing houses. Study of crop production techniques, suitable crops with varieties, irrigation systems, water management, soil moisture conservation methods etc. for the eastern region of Uttar Pradesh.

VSC 612 Advances in Breeding of Vegetable Crops 3(2+1)

Theory:

Evolution, distribution, cytogenetics, genetic resources, genetic divergence, types of pollination and fertilization mechanisms, sterility and incompatibility, anthesis and pollination, hybridization, inter-varietal, interspecific and inter-generic hybridization, heterosis breeding, inheritance pattern of traits, qualitative and quantitative, plant type concept and selection indices, genetics of spontaneous and induced mutations problems and achievements of mutation breeding, ploidy breeding and its achievements, *in vitro* breeding; breeding techniques for improving quality and processing characters; breeding for stresses, mechanism and genetics of resistance, breeding for salt, drought; low and high temperature; toxicity and water logging resistance, breeding for pest, disease, nematode and multiple resistance. Vegetable production technologies, suitable vegetable crops with varieties, biotic and abiotic stress management methods for the eastern part of Uttar Pradesh.

UNIT I:Tomato, brinjal, chilli, sweet pepper and potato
UNIT II: Cucurbits, Cabbage, cauliflower and knol- khol
UNIT III: Bhindi, onion, peas and beans, amaranthus and drumstick
UNIT IV: Carrot, beet root and radish
UNIT V: Sweet potato, tapioca, elephant foot yam and taro
Practical:

Designing of breeding experiments, screening techniques for abiotic stresses, screening and rating for pest, disease and nematode resistance, estimation of quality and processing characters, screening for-quality improvement, estimation of heterosis and combining ability, induction and identification of mutants and polyploids, distant hybridization and embryo rescue techniques. Study of crop improvement techniques for suitable vegetable crops under the region of Uttar Pradesh.

AE-511 Micro Economics 3(3+0)

Theory:

Theory of Consumer Behaviour: utility, utility function, utility maximization, want and its classification, cordinal and ordinal approaches. Theory of demand, Demand function, elasticity of demand law of Diminishing utility, Law of Equi-Marginal utility, and consumer's surplus, Definition of indifference curve, marginal rate of substitution, properties of IC, indifference curve and consumer equilibrium, price consumption curve, Income consumption curve, cross effect, Giffen Paradox, Revealed preference Derivation of Demand curve. Basic theory of firm: Concepts, production functions, productivity curves, ISO quant - analytical approaches, limitation and applications, optimization behaviour, Alternative models, short run and long-run-cost, cost Functions, factor demand, profit maximization, joint product, price determination of output and factor pricing under varying market conditions in Uttar Pradesh based on various Agroclimatic zones. concepts, constraints optimization, duality in production. Production under uncertainty, Linear production, Functions for single and multi out-put cases/ perfect competition, market demand function. Commodity market, equilibrium short run, long run. Factor market supply, demand function, market hedging. Study of markets of Eastern U.P, Input supply and factors affecting price in local markets, mandi etc

AE-513 Farm Management Analysis 3(2+1)

Theory:

Meaning and scope of farm management, its importance, characteristics of farm management: relationship of farm management with other sciences, types and system of farming, principle of comparative advantage, factor-product relationship, factor-factor relationship, product-product relationship, cost principle, equi-marginal returns, opportunity cost principle, Principles involved in farm management decisions, tools of farm management analysis, farm planning, principal characteristics of a good farm plan, information for planning and budgeting, farm budgeting, partial budgeting, enterprise budgeting and complete budgeting. Farm business analysis, type of farm records and accounts, farm financial accounts, Review for research studies on the management factor in farming, efficiency measures for different types of farms, use of records in research. Application of farm management, farm finance, and production economics for Agroclimatic zones of U.P.

STAT-517 Design of Experiments-I 3(2+1)

Theory:

Planning and designing of experiments, Basic principles of Design of Experiments, uniformity trials, Fairfield Smiths' law, shape and size of plots and blocks. Elements of linear estimation variance stabilizing transformations. Analysis of variance and covariance. Completely

randomized, Randomized block and Latin Square designs with emphasis on Agro-climatic crops of U.P. Mutually orthogonal Latin Square, missing plot techniques. Balanced incomplete block (BIB) designs- General properties analysis with and without recovery of information. Repeated measurement designs. Grouping of experiments. Factorial experiments, Confounding in symmetrical factorial (in particular 2^n and 3^n series) experiments. Split plot and strip plot designs. Concepts of associated scheme, partially balanced incomplete block (PBIB) designs with two associate class, sampling in field experiments, experiments on cultivators fields, Long term and rotation experiments.

Practical :

Determination of size and shape of plots and blocks from uniformity trials data. Analysis of data generated from completely randomized design, randomized complete block design, Lattice design, PBIB designs, Latin square design, Youden square design, 2^n factorial experiments with and without confounding, split and strip plot designs, repeated measurement design. Analysis of covariance, Analysis of Groups of experiments. Missing Plot techniques. Sampling in field experiments.

STAT-518 Sampling Techniques-I 3(2+1)

Theory:

Planning of a survey, methods of data collection, questionnaire versus schedule, problems of sampling frame, choice of sampling design. Probability sampling, sample space, sampling design, simple random sampling, estimation of proportions, confidence interval, determination of sample size, inverse sampling. Stratified sampling, Ratio and regression methods of estimation, Cluster sampling, Multistage sampling with equal probability, Double sampling, Systematic sampling, Non-sampling errors- source and classification, Non-response in surveys, interpenetrating sub-sampling. Sampling strategies due to Horvitz and Thompson, Midzuno-Sen, Rao-Hartley-Cochran.

Practical:

Determination of sample size and selection of sample. Simple random sampling, Inverse sampling, sampling with varying probabilities in context of data pertaining to regional agricultural crops, stratified sampling, Ratio and regression methods of estimation. Cluster, Systematic, double, multi-stage sampling.

AGM 511 Fundamentals of Meteorology 3 (2+1)

Theory:

Weather elements, compositions & vertical structures of atmosphere, variation of temperature & pressure with height. Lapse rate, pressure gradient. Cyclonic & Anticyclone motions, Geotropic and gradient winds, Polar & trade winds, Flow of winds in upper and lower atmosphere Solar radiation, law of radiation and radiation balance Various humidity parameters & their relationship, vapour pressure, Psychometric equation. Process of condensation, clouds & their classification, Evaporation, rainfall & its types, Artificial rain making precipitation, Dew, Frost, Fog, Mist, Thunder storm and Effect of earth rotation on zonal distribution of radiation & season, Hydrological cycle, Layout & types of Agromet observatory. Monsoon and its origin; Indian monsoon and its seasonal aspects: Onset,

advancement and retreat of monsoon in different parts of India, El Nino, La Nina, Southern Oscillation Index and their impact on monsoon.

Practical:

Layout selection installation Agromet. Measurement calculation solar radiation. Analysis of rainfall characteristics. Measurement of average depth rainfall over an area. Computation various types atmospheric humidity. Measurement growing degree-days/ thermal unit. Measurement Absorb photosynthetic radiation. Preparation temperature- Height diagram atmosphere calculation lapse.

AGM 525 Weather Forecasting & Weather Based Agro-Advisory 3(2+1)

Theory:

Introduction Agriculture and principle of weather forecasting & its uses; Types of weather forecasting and their application in Agriculture; Short range weather forecasting, Medium range weather forecasting, Long range weather forecasting of weather forecasting: Methods; Numerical method, Statistical method, Satellite & cloud imageries Synopic charts method, DMO method. Crop yield forecasting methods; Maize Rice & Wheat yield forecast model, Forest fire forecast model, Local weather forecasting skills, Monsoon & Western depression , Meteorological basis of disease and insect & pest forecasting ; Long range forecasting, Bacterial wilt & leaf blight, Corn flea beetle Medium range weather forecasting, Wheat rust, Rice stem borer, Potato blight. Accuracy analysis of weather forecast; Error structure eg RK Score, HK Score, Threat scare & RMSE. Contingency table for category structure of error (for rainfall & max min temp only). Preparation and mode of dissemination of agro-advisories on the basis of weather forecast 6. Economic impact assessment of agro-advisory-rating & feed back from farmers for its adoption f. Merits and demerits of the weather based agro-advisory and its importance in present agricultural scenario Application of weather forecasts in different area(s) 1) Air & defenses, Forest & Telecommunication, Social & others, Indigenous Technical Knowledge (ITK) base- signals from flora, fauna, insects, birds, animals behavior; various methods of verification of location-specific weather forecast.

Practical:

Calculation of success probability and accuracy of weather forecast. Calculation of Ratio score & H.K. score and its interpretation. Calculation of the critical success index (Threat score) and usability analysis of weather forecast. To calculate RMS (Root Mean Square) and correlation coefficient for skill of forecast. To prepare the contingency table of weather forecast (rainfall/ temperature). Preparation of weather based agro-advisory Economic impact assessment of weather based Agro-advisory Feed-back collection from farmers about weather forecast and advisory Demonstration & Handling of VSAT.

AGM 527 Fundamentals of Climatology 3(3+0)

Theory:

Meaning & scope of Climatology Elements of climate and climatic classification. Factors of climate and its Impact. Classification of climate: Koppen, Thornthwaite, Hydric methods, Hargreaves systems, Cocheme & Frankuin method, Troll's methods Climate types characteristics & their distribution: Tropical Wet/Dry & Tropical monsoon climate, Equatorial climate, Temperature climate Tropical Hot desert climate. Continental climate. Monsoonal &

Maritime climate. Climatic Agro-climatic zones of India. Agro-ecological zones of India Indices for Agroclimatic regionalization. Agro-climatic index; Thermal Index Moisture index, Aridity index, Humidity Index etc. Climatic change and its causes Climatic variability and its Impact on Agriculture. Monsoon; North-East monsoon, South-West monsoon. Global warming. Crop weather calendars; Agro climatic requirement of crops with particular emphasis on regional crops.

VPY 605 Growth and Environmental Physiology I 2 (2+0)

Theory:

Unit I: Growth - Introduction and Concepts. Hormonal regulation of growth. Growth promoters.
Unit II :Minerals - Classification-functions and disorders. Chelated minerals, nanominerals.
Unit III :Vitamins - Classification-functions and disorders. Synthetic vitamins.
Unit IV: Environment - Introduction and concepts. Weather and climate. Homeothermy, Poikilothermy. Hibernation and estivation. Thermoregulation, thermal stress. Effect of environment on production and reproduction of domestic animals of eastern Utter Pradesh. Study of weather and climate of eastern plane zone of Uttar Pradesh.

VPY 611 Physiology of Wild Life 1(1+0)

Theory:

Unit I: Overview of Indian forests special reference to forests of Uttar Pradesh Identification of sex in wild animals and birds - Blood collection methods in wild animals – Hematology - Common clinical biochemical estimations.
Unit II: Body temperature measurement techniques – Measurement of stress in wild animals of different forests of UP- Measuring senescence. Reproduction management in wild animals - Understanding sound mechanics and communication methods – Ethology of wild animals - Government policies for wild life protection in Uttar Pradesh.

VOG 601 General Gynaecology 3(3+1)

Theory:

UNIT I: Puberty and sexual maturity, role of hypothalamic-pituitary-gonadal axis in attainment of puberty and sexual maturity, onset of postpartum ovarian activity, Endocrine regulation of estrous cycle. Study of age of puberty and sexual maturity in local breeds of Eastern zone of Uttar Pradesh. Study of postpartum events in local breeds. Therapeutic management of infertility in local breeds of domestic animals.
UNIT II: Folliculogenesis, oogenesis and ovulation and associated endocrine pattern, manipulation of follicular waves, synchronization of estrus and ovulation and induction of ovarian activity.
UNIT III: Gamete transport, fertilization, implantation and maternal recognition of pregnancy.
UNIT IV: Embryonic and fetal development, placentation, fetal circulation and gestation, position of fetus in the uterus, age characteristics of fetus.
UNIT V:: Pregnancy diagnosis: clinical, ultrasonographic, endocrinological and other diagnostic laboratory tests. Pseudo-pregnancy and its treatment.
UNIT VI: Factors affecting reproduction – seasonality, nutrition, stress, environment, management, suckling and diseases. Utilization of localy available fodders in augmentation of reproductive parameters.

UNIT VII: Lactation and artificial induction of lactation. Lactation and artificial induction of lactation with special reference to eastern zone of UP.

Practical:
Clinical examination of female genitalia. Biometry of female genital organs. Rectal and vaginal examination to diagnose cyclic phases of estrous cycle. Fern pattern of cervical mucus and exfoliated vaginal cytology. Pregnancy diagnosis in large and small animals by various methods. Estimation of age of the fetus. Use of ultrasound / RIA / ELISA in gynaecology. Synchronization of estrus and ovulation in farm animals. Synchronization of estrus and ovulation in farm animals in indigenous breeds of sheep and goat.

VOG 602 Female Infertility 3(3+1)

Theory:

UNIT I: Introduction to infertility, classification, economic impact. Anatomical causes of infertility, congenital and hereditary causes and acquired defects.
UNIT II: Nutritional causes of infertility. Importance of body condition score.
UNIT III: Managemental and environmental causes of infertility. Out of season breeding.
UNIT IV: Infectious causes of female infertility, specific and non-specific infections.
UNIT V: Ovarian dysfunction: anoestrus, cystic ovarian degeneration, anovulation, delayed ovulation and luteal insufficiency.
UNIT VI: Repeat breeding: its causes, diagnosis and treatment. Study of repeat breeding: its causes, diagnosis and treatment in local breeds of sheep and goats.
UNIT VII: Early embryonic death (EED): causes, diagnosis and therapeutic management.
UNIT VIII: Abortion: infectious and non-infectious causes, diagnosis and prevention of abortion. Study of causes of abortion due to local poisonous plants, their diagnosis and prevention of abortion.
UNIT IX: Interactions in Immunological mechanisms and infertility.

Practical:
Record keeping, herd fertility assessment and management, diagnosis and treatment of infertility in female animals, use of uterine swabs for bacterial and fungal culture, histo-pathological evaluation of uterine biopsy, exfoliated vaginal cytology and hormone assay. Use of ultrasonography in diagnosis of infertility. Immuno diagnostic techniques.

VOG 603 Veterinary Obstetrics 4(2+2)

Theory:
UNIT I: Parturition: stages of parturition, mechanism of initiation of parturition, hormonal profiles associated with parturition.
UNIT II: Principles of handling of dystocia, obstetrical procedures: mutations, fetotomy, caesarean section. Obstetrical anesthesia and analgesia, epidural anesthesia.
UNIT III: Fetal and maternal dystocia: causes, diagnosis and management.
UNIT IV: Uterine torsion: causes, diagnosis and its correction.
UNIT V: Diseases and accidents during gestation and around parturition.
UNIT VI: Etiology, diagnosis and treatment of ante-partum and post-partum uterine and vaginal prolapse.

UNIT VII: Induction of parturition and elective termination of pregnancy. Induction of parturition in infertile animals of the region of Ayodhya district. Elective termination of pregnancy in local dogs.
UNIT VIII: Involution of uterus following normal and abnormal parturition.
UNIT IX: Care of dam and the newborn.

Practical:
Pelvimetory of different species of farm animals. Diagnosis and correction of abnormal fetal presentation, position and posture in phantom box. Epidural anesthesia, ovariohysterectomy and caesarean operation. Fetotomy exercises. Detorsion of uterus. Management of prolapse. Handling of clinical cases of dystocia. Pelvimetory of local breed of animals.

VOG 604 Andrology and Male Infertility 4(3+1)
Theory:

UNIT I: Structure and function of reproductive tract of male.
UNIT II: Sexual behavior and examination of bulls for breeding soundness.
UNIT III; Spermatogenesis, (formation, migration, maturation and ejaculation of semen), fine structure of spermatozoa, semen and its composition.
UNIT IV: Diseases transmitted through semen.
UNIT V: Factors affecting semen quality, semen culture, tests for assessment of sperm motility, sperm survival and fertilizing capacity of spermatozoa.
UNIT VI: Causes of infertility: hereditary, congenital, infectious, nutritional and hormonal. Pathological and functional disturbances of epididymis, vas deferens and accessory sex glands. Causes of infertility: hereditary, congenital, infectious, nutritional and hormonal in local breeds. Pathological and functional disturbances of epididymis, vas deferens and accessory sex glands in local breeds.
UNIT VII: Impotentia cocundi and impotentia generandi. Testicular hypoplasia and degeneration: causes and affect on semen and fertility.
UNIT VIII: Coital injuries and vices of male animals. Coital injuries and vices of male animals in region of Ayodhya.

Practical
General and rectal examination for biometrics of male genitalia and accessory sex glands. Breeding soundness evaluation of male animals. Semen evaluation for sperm abnormalities, fertility and determination of other biochemical constituents of seminal plasma. Computer assisted semen analysis (CASA), Microbiological load of semen. Examination, diagnosis and treatment of infertile male animals.

VOG 605 Semen Preservation and Artificial 3(2+1)

Theory:

UNIT I: History of artificial insemination.
UNIT II: Methods of semen collection.
UNIT III: Semen evaluation: macroscopic, microscopic, biochemical and microbiological tests, Computer assisted semen analysis (CASA).
UNIT IV: Semen preservation. Extenders for preservation of semen at different temperatures. Semen additives for enhancement of motility and fertilizing capacity of spermatozoa.

UNIT V: Cryopreservation of semen. Effects of cryopreservation on spermatozoa, semen quality and fertility.
UNIT VI: Thawing protocols of frozen semen. Factors affecting post-thaw semen quality.
UNIT VII:Ideal protocol for AI in different species of animals. Factors affecting success of AI.

Practical:
Computer assisted semen analysis (CASA), Collection and evaluation of semen. Preparation of extenders. Preservation of semen collected from local animals : room temperature, refrigeration and cryopreservation. Handling and evaluation of processed semen. Practice of AI techniques.

VOG 607 Clinical Practice - I 3(0+3)

Practical:
Clinical examination of animals affected with reproductive disorders, use of diagnostic techniques for diagnosis and institution of required therapy. Maintenance of case records. Presentation on selected /assigned cases. Hands-on training on diagnosis and treatment of reproductive disorders in local breeds.

VOG 608 Clinical Practice – II 3(0+3)

Practical:
Clinical examination of animals affected with reproductive disorders, use of diagnostic techniques for diagnosis and institution of required therapy. Maintenance of case records. Presentation on selected /assigned cases. Hands-on training on diagnosis and treatment of reproductive disorders in local breeds

VPH-601 Elements Of Veterinary Public Health 2(1+1)

Theory:

UNIT I: The purposes and scope of veterinary public health; veterinary interests in public health, principal functions and fields ofactivity of public health veterinarians.
UNIT II: Definition of veterinary public health administration; organisation, administration and implementation of veterinary publichealth services and programmes.
UNIT III: Public health team, administration and functions; place ofveterinarian in the public health team; veterinary public health agencies and institutions in India and abroad. Health and hygiene status of the people of Purvanchal region. Education on gender related health problem in the community.
Practical :

Collection of information about set up of veterinary publichealth in different countries.

VPH-602 Bacterial and Rickettsial Agents Of Public Health Significance 3(2+1)

Theory:

UNIT I: Importance of microbes in relation to veterinary public health; cultural, biochemical and other identification characters; ecology, transmission and survivability of bacteria in nature.
UNIT II: Description of Bacillus, Listeria, Mycobacterium, Clostridium, Staphylococcus, Enterococcus, Brucella and Leptospira
UNIT III: Description of Vibrio, Salmonella, Escherichia, Campylobacter, Yersinia, Lactobacillus, Pseudomonas and Micrococcus.
UNIT IV: Description of Coxiella, Rickettsia and Chlamydia. Study on zoonotic diseases in Purvanchal region in Uttar Pradesh.

Practical:

Isolation and identification methods for important bacterialand rickettsial agents of public health significance from host, vehicleand environment.

VPH 603 Viral, Fungal and Parasitic Agents of Public Health Significance 3**(2+1)**

Theory:

UNIT I: Systematic study of viral agents of Japanese encephalitis, encephalomyelitis, rabies, influenza, KFD, Rift valley fever, and enteroviruses; their morphological and other characters, ecology,transmission and survivability in nature.
UNIT II: Description of fungal agents of public health importance belonging to genera: Aspergillus, Penicillium, Fusarium, Mucor, Histoplasma, Microsporum, Trichophyton and Sporotrichum.
UNIT III: Description of parasites of public health importance: Taenia, Echinococcus, Trichinella, Toxoplasma, Diphyllobothrium, Fasciola, and Cryptosporidium. Study of fungal viral and parasitic zoonotic diseases prevalent in Purvanchal region of Uttar Pradesh.

Practical:
Isolation and identificationmethods for important fungal, viral and parasitic agents of public health significance from host, vehicle and environment.

VPH-605 Principles Of Food Hygiene and Safety 3(2+1)

Theory:

UNIT I: Relation between veterinary public health and food hygiene;concept of food hygiene, impact of environmental sanitation and other factors on food quality.
UNIT II: Food spoilage, safety and preservation methods.
UNIT III: Microbiological standards and quality control (biological and other indicators of hygienic quality and spoilage) of foods to prevent food-borne infections.
UNIT IV: General principles of prevention of food-borne illnesses, GMP, HACCP, risk analysis. Study on common adulterant in milk and milk product sold out in Purvanchal region.

Practical:

Procedures of evaluation of hygienic/microbiological quality of raw and processed foods especially of animal origin by detection of biological and other indicators.

VPH-607 Meat and Milk Hygiene 3(2+1)

Theory:

UNIT I: Principles of food hygiene with special reference to foods ofanimal origin, human health and economics, nature and problem of food supply in India.
UNIT II: Meat hygiene and public health, abattoir hygiene.
UNIT III: Milk hygiene and public health, in place cleaning.
UNIT IV: Egg, food legislation, meat and milk adulteration.
Practical:

Milk and meat inspection, quality control tests of meat,milk and fish. Assessment of quality of meat and fish sold out in local market.

VPH-608 Environmental Pollution and Safety 4(3+1)

Theory:

UNIT I: Introduction to environmental hygiene, environment andhealth, microbial aspects of pollution.
UNIT II: Soil pollution, air pollution, water pollution and health.
UNIT III: Genetic risk from environmental agents, health problems from nuclear energy and radiation pollution, environmental estrogensand pesticides pollution.
UNIT IV: Dissemination of excreted pathogens, animal-waste andhuman risk, principles of safe disposal of waste.
UNIT V: Heavy metals, pesticides, veterinary drug residues andhuman health. Awareness of local people regarding prevention of environmental pollution. Study on quality of drinking water in Purvanchal region.

Practical:
Determination of potability of drinking water, estimation and detection of pathogenic microbes in water, air,soil, animal products, sewage, and animal waste, inspection of sewage and waste disposal plants/sites.

VPH-609 Fish, Fish Products and Seafood Hygiene 2(1+1)

Theory:

UNIT I: Fisheries and resources, fish preservation, hygienic quality control
UNIT II: Hygienic disposal and utilization of byproducts of fish, hygienic handling, transportation and marketing of fish.
UNIT III: Fish borne diseases in relation to human health.
Practical: Study of physical and biological indicators of wholesomefish to determine hygienic status of raw and processed fish. Residue analysis in fish. Study on microbiological quality of fish sold out in local market as well as Purvanchal region.

VPH-701 Current Topics in Veterinary Public Health 3 (2+1)

Theory:

UNIT I: Contemporary status of Veterinary Public Health administration, organisation and

functions of veterinary public healthagencies in India and abroad.
UNIT II: Advanced studies on principles, diagnostic methods ofemerging public health problems, advances in zoonotic diseases.
UNIT III: Role of biotechnology in food hygiene, Hazard Analysis Critical Control Point System (HACCP). Education on mental health of local people.
Practical Special problems related to field investigations ofoutbreaks of food poisoning and zoonotic diseases in a community. Study on the factors responsible for mental illness among the local people.

VPH-702 Emerging and Re-Emerging Zoonoses 3 (2+1)

Theory:

UNIT I: Concept of emerging and re-emerging zoonotic infections, international interests in zoonoses, measurement and economics of zoonoses, latest diagnostic and management planning for zoonoses.
UNIT II: Current challenges and strategies, euzoonoses, xenozoonoses, nosocomial zoonoses, newer zoonotic agents viz. cat-scratch disease, rat bite fever, Creutzfeld-Jacob disease, Ebola, Marburg, Lassa, Nipah, Menangle, Herpes B, SARS.
UNIT III: Simian and human immunodeficiency, bovine spongiform encephalopathy, hepatitis A & E, toro, H5N1 influenza virus; re- emerging zoonoses with new pathology viz. neurocysticercosis, campylobacteriosis, rabies, GuillanBarre Syndrome, tuberculosis. Study on MDR and XDR tuberculosis in local people and their nutritional status.

Practical:
Special problems related to emerging/re-emergingprevalent zoonotic diseases in India.

VPH-704 Occupational Health Hazards 3 (2+1)

Theory:

UNIT I: Health/diseases associated with various occupations
UNIT II: Transportation, spread, maintenance and control of diseases affecting various occupational groups in contact with animals and their public health significance. Occupational health hazards prevalent in local people. Occupational health hazards due to various factories in Purvanchal region.
Practical:
Diagnosis of various occupational diseases of public healthsignificance, identification and characterization of causative agents

VPH-705 Disposal and Recycling of Waste 3(2+1)

Theory:

UNIT I: Concept of 'reduce, reuse and recycle' in environmental management, role of holistic environmental biotechnology and microbial control of pollution.
UNIT II: Safe disposal of animal waste and food plant waste, utilization/recycling of livestock waste.
UNIT III: Pollutants due to sewage, sewage treatment systems, solid waste and its management. Problems associated with the wastes generated with community and factories in

Purvanchal region.

Practical:
To study the role of microorganisms and chemicals in degrading waste, to study the factors influencing biodegradation.

VPH-706 Biohazards, Biosecurity & Disaster Management 3(3+0)

Theory:

UNIT I: Biohazards and bioterrorism: case studies.
UNIT II: Innovative biosecurity approaches.
UNIT III: Regulations for safety in laboratories, hospitals, biologicalplants.
UNIT IV: Case studies of natural and man-made disasters. Approaches for management of disasters. Formation of teams/ groups. Equipments required for managing such disasters. Education to the local people working in the hospital for prevention of biohazards.Education to the local people about preparedness for the disasters in Purvanchal region.

VPH-708 Advances in Environmental Pollution Control 3(2+1)

Theory:

UNIT I: Advanced studies on problems pertaining to environmental hygiene, air, soil and water pollution, disinfection procedures, impact of global environmental problems on human/animal health; ecophilosophy, environmental ethics and environmental economics, environmental conflicts and cooperation.
UNIT II: Environmental risks and management, environmental risk assessment and reporting, modern global information, surveillance and monitoring systems, decision making and public awareness.
UNIT III: International environmental management efforts, participatory international organizations and their selected programmes and selected legislations. Major causes of environmental pollution in Purvanchal region. Education to the local people about to the risk from environmental contaminants.

Practical:
Detection and estimation of air, soil and water pollution; detection of pathogens in environmental sources.

VCM 601 Ruminant Clinical Medicine - I 2(2+0)

Theory:

UNIT I General systemic states.
UNIT II Diseases of alimentary system, liver and urinary system.
UNIT III Diseases of respiratory and nervous system.
UNIT IV: Diseases of cattle, buffalo , sheep and goats common in different agroclimatic zones of Eastern Uttar Pradesh.

VCM 602 Ruminant Clinical Medicine - II 2(2+0)

Theory:

UNIT I Diseases of cardiovascular system, blood and blood forming organs.
UNIT II Diseases of musculoskeletal system and skin
UNIT III Diseases of eyes, ears, nose
UNIT IV : Diseases common in different agroclimatic zones of Eastern Uttar Pradesh.

VCM 603 Equine Clinical Medicine 2(2+0)

Theory:

UNIT I General systemic states and diseases of alimentary system and liver.
UNIT II Diseases of respiratory, cardiovascular system, blood and blood forming organs
UNIT III Diseases of urinary and nervous systems
UNIT IV Diseases of musculoskeletal system and skin.
UNIT V: Diseases of equines common in different agroclimatic zones of Eastern Uttar Pradesh.

VCM 604 Canine and Feline Clinical Medicine -II 2(2+0)

Theory:

UNIT I Specific needs of canine and felines, Pet psychology; pet behavior and adaptation needs; General systemic states.
UNIT II Diseases of digestive system, liver and pancreas, cardiovascular system, blood and blood-forming organs
UNIT III Diseases of respiratory system, urogenital and nervous systems.
UNIT IV Diseases of musculoskeletal system and skin.
UNIT V Diseases of endocrine system, diseases of new borne animals.
UNIT VI: Any specific disease of dogs and cats common in Uttar Pradesh

VCM 605 Swine Clinical Medicine 2(2+0)

UNIT I General systemic states and diseases of digestive system
UNIT II Diseases of cardiovascular and respiratory system.
UNIT III Diseases of urogenital and nervous system and skin.
UNIT IV Diseases of endocrine system and of newborn animals.
UNIT V: Disease of pigs common in Eastern Uttar Pradesh

VCM 606 Avian Medicine 2(2+0)

UNIT I Diseases due to deficiency of vitamins (vitamins A, B complex, C, D, K); minerals (calcium, phosphorus, manganese, zinc) and sodium chloride.

UNIT II Miscellaneous diseases/conditions/ vices (cage layer fatigue, blue comb disease, beak necrosis, round heart disease, kerato- conjunctivitis, ascites, urolithiasis, fatty liver, kidney hemorrhagic syndrome, heat stroke, cannibalism, vent picking).
UNIT III: Disease of pigs common in Eastern Uttar Pradesh

VCM 608 Clinical Diseases of Animal Species 1(1+0)

UNIT I: Non-infectious/miscellaneous diseases of camels (satyriasis, kumri, allotriophagia, diseases of various body systems, nutritional deficiency disorders).

UNIT II: Diagnostic tests related to various non-infectious diseases of camels.

VCM 609 Production Diseases 2(2+0)

UNIT I General aspects, production diseases (parturient paresis, downer cow syndrome, ketosis, post-parturient haemoglobinuria, hypomagnesemic tetany, pregnancy toxaemia).
UNIT II Lactation tetany of mares, eclampsia of bitches, osteodystrophia fibrosa, azoturia of equines, rheumatism-like syndrome in buffaloes, hypothyroidism, diabetes mellitus and diabetes insipidus in dogs.
UNIT III Deficiency diseases (calcium, phosphorus, vitamin-D3, vit-A, vit Bcomplex, vit-C and vit-K).
UNIT IV Deficiency diseases (iron, copper, cobalt, zinc, manganese, iodine, vitamin E and selenium).
UNIT VI: Production disease common in Eastern Uttar Pradesh to be discussed

VCM 610 Diseases of Animals Caused by Toxicants 1(1+0)

UNIT I Diseases caused by physical agents and poisoning of organic and inorganic compounds.
UNIT II Diseases caused by farm chemicals and phytotoxins
UNIT III Diseases caused by mycotoxins and zootoxins
UNIT IV Diseases caused by poisonous plants, snake and insect bites.
UNIT V: Identification of common toxicants and management of common toxicities common in Eastern Uttar Pradesh

VCM 611 Veterinary Forensic Medicine 2(1+1)

UNIT I Veterolegal aspects of ante mortem and post mortem examination.
UNIT II Examination of wounds, blood, offenses, frauds in animals and their products, animal cruelty and welfare. DNA analysis of clinical samples
UNIT III Study of common laws related to veterolegal aspects.
Practical:
Ante mortem and post mortem examination, examination of wounds, blood, offenses, frauds in animals and their products, collection, dispatch and examination of veterolegal samples.

VCM 614 Clinical Practice - I 3(0+3)

Application of the theoretical concepts in practice, Practical Diagnostic and therapeutic protocol application, specimen collection, examination and management of sick farm and companion animals brought to VCC from different parts of Eastern Uttar Pradesh. Note: This course shall be conducted in TVCSC (College Clinics), where students shall participate in diagnosis and treatment of diseased animals).

VCM 615 Clinical Practice - II 3(0+3)

Application of the theoretical concepts in practice Practical Diagnostic and therapeutic protocol application, specimen collection, examination and management of sick farm and companion animals brought to VCC from different parts of Eastern Uttar Pradesh. Note: This course shall be conducted in TVCSC (College Clinics), where students shall participate in diagnosis and treatment of diseased animals).

VCM 701 Advances in Gastroenterology 2(2+0)

UNIT I Advances in diagnosis, therapy and control of diseases of gastrointestinal system and associated organs of farm animals.
UNIT II Advances in diagnosis, therapy and control of diseases of gastrointestinal system and associated organs of companion animals. Practical Advanced clinical procedures for the diagnosis of diseases of gastrointestinal system and associated organs of farm and companion animals
UNIT IV: Diseases of gastrointestinal system and associated organs commonly encountered in this region

VCM 702 Advances in Cardiopulmonary Medicine 2(2+0)

UNIT I Advances in diagnosis and therapeutic management of diseases of circulatory system
UNIT II Advances in diagnosis and therapeutic management of diseases of respiratory system
UNIT III Advances in diagnosis and therapeutic management of diseases of blood and blood forming organs in animals
UNIT IV: Diseases of Cardiopulmonary system commonly encountered in this region

VCM 703 Advances in Neurological and Urological Disorders 2(2+0)

UNIT I Advances in diagnosis, therapy and control of diseases of nervous system
UNIT II Advances in diagnosis, therapy and control of diseases of urogenital system
UNIT III Advances in diagnosis, therapy and control of diseases of locomotor system
UNIT IV: Neurological and Urological Disorders common in Eastern Uttar Pradesh to be discussed

VCM 704 Advances in Endocrine and Dermatological Disorders 2(2+0)

UNIT I Advances in diagnosis, therapy and control of diseases of skin and integumentary system
UNIT II Advances in diagnosis, therapy and control of diseases of endocrine system.
UNIT III: Diseases of endocrine and skin commonly encountered in this region.

VCM 705 Advances in Production Diseases 2(2+0)

UNIT I Latest advances in diagnosis, therapy and prophylaxis of metabolic diseases of farm and companion animals.
UNIT II Latest advances in diagnosis, therapy and prophylaxis of nutritional diseases of farm and companion animals.
UNIT III Latest advances in diagnosis and treatment of various poisonings and toxicities Suggested Readings Selected articles from journals.
UNIT IV: Production disease and toxicities common in Eastern Uttar Pradesh to be discussed

VCM 706 Advances in Paediatrics and Geriatrics 1(1+0)

UNIT I Recent advances in diagnosis, therapy and control of diseases and management of emergencies of neonates
UNIT II Recent advances in diagnosis, therapy and control of diseases and management of emergencies of geriatric animals
UNIT IV: Diseases of new born commonly encountered in this region.

VCM -708 Advances in Veterinary Therapeutics 3(1+2)

UNIT I Fluid and electrolyte imbalance and therapy.
UNIT II Antimicrobial, antineoplastic and hormonal therapy.
UNIT III Blood transfusion and Emergency critical care, Peritoneal dialysis / hemodialysis, Gastric lavage, fluid therapy, parenteral total nutrition, nebulization, oxygen therapy, paracentesis, thoracenetsis.
Practical :
Assignments on advanced therapeutic approaches in various diseases of domestic animals.

VCM- 709 Advanced Clinical Practice - I 2(0+2)

Application of the theoretical concepts in practice Practical Diagnostic and therapeutic protocol application, specimen collection, examination and management of sick farm and companion animals brought to VCC from different parts of Eastern Uttar Pradesh. Note: This course shall be conducted in TVCSC where students shall participate in diagnosis and treatment of diseased animals).

VCM -710 Advanced Clinical Practice – II 2(0+2)

Application of the theoretical concepts in practice Practical Diagnostic and therapeutic protocol application, specimen collection, examination and management of sick farm and companion animals brought to VCC from different parts of Eastern Uttar Pradesh.

VCM -711 Advanced Clinical Practice - III 2(0+2)

Application of the theoretical concepts in practice. Practical Diagnostic and therapeutic protocol application, specimen collection, examination and management of sick farm and companion animals brought to VCC from different parts of Eastern Uttar Pradesh. Note: This course shall be conducted in TVCSC (College Clinics), where students shall participate in diagnosis and treatment of diseased animals).

EXT-608 Livestock Entrepreneurship 1(0+1)

Practical:

To impart Knowledge of rural framers and women in the field of livestock, motivate Business plan as per availability of recourse in the village for Entrepreneurship development. Motivate to Local rural framers and women nearby ANDUAT for Adoption of dairy and poultry as Business oriented work through self help group (SHG).

EXT-608 Human Resource management in Animal Husbandry 1(0+1)

Practical:

To Organise training programme as per local needs of rural framers and women for better utilization of Human Resource management in the field of livestock. Motivate and increase the performance of rural framers and women in the field of Animal husbandry development as per local needs of the rural farmers.

VPP 606 Necropsy Procedures and Inter Pretations -II 1(0+1)

Practical:

Detailed necropsy examination of various species of small animals, poultry, laboratory animals and wildlife. Necro psycase presentation and report writing/protocol preparation. Collection of specimens for diagnosis of viral, bacterial, protozoan, parasitic diseases, toxic/poisoning and for histochemistry/histopathology. Systemic examination of brain, lungs, heart, endocrine glands, lymph nodes, liver, Gastro Intestinal tract, urinary and genital systems for gross pathological and histopathological studies and correlation of the observations to diagnose the disease conditions. Precautions to be taken during handling of carcasses suspected for communicable diseases. Disposal of carcasses by various methods from public health point of view.

VPP -608 Pathology of infectious diseases of domestic animals 3(2+1)

Theory:

UNIT I : Pathology of various viral diseases of domestic animals.
UNIT II: Pathology of various bacterial and fungal diseases of domestic animals.
UNIT III: Pathology of various rickettsial and parasitic diseases of domestic animals.
UNIT IV: Pathology of commonly occurring regional diseases.

EXT-701 Organizational Leaders ship and management 1(0+1)

Practical:

To develop effective communication and networking to increase the efficiency of an organization to increase the performance by utilization of rural resources. To develop leader and leadership in a dairy farmers of different organization through effective communication.

EXT-703 Training for development 1(0+1)

Practical:

To impart Knowledge on planning, implementation and evolution of various training programme for rural framers and women. Capacity building and capacity development of rural framers and women through informative and participatory approach.

VPP-708 Pathology of Fungal Diseases 3(2+1)

Theory:
UNIT I: Pathology of diseases associated with pathogenic fungi like aspergillosis, candidiasis, epizooticly mphangitis, histoplasmosis, coccidioido mycosis, cryptococcosis, bovineabortions, dermatophy to mycosis etc.
UNIT II: Diseases associated with mycotoxins like aflatoxins, rubratoxin, T2 toxin, ochratoxin etc. Metabolism of toxins and their effect in man, domestic and laboratory animals, poultry and aquatic species.
UNIT III: Pathogenesis, pathology and diagnosis of locally important fungal diseases of animals.

LPM -701 Advances in Cattle and Buffalo Production and Management 3(3+0)

Theory:

UNIT I: Dairy farming in India – Global scenario - Present status and reasons for the same – Avenues for progress – The needs of the nation and how to achieve it.
UNIT II: Advances in housing management of dairy cattle and buffaloes in various agroclimatic zone of India - Management systems for cattle and buffaloes.
UNIT III: Establishing Dairy Cattle Enterprise – Characteristics of a successful dairy farm – Choice of the foundation stock – Breeding Management Problems associated with reproduction.
UNIT IV: Advances in Feeding Management of cattle and buffalo, Feed for milking herd, dry cows, bulls and calves, Management of high yielding animals.
UNIT V: Milking Management – Biosynthesis of milk - Factors affecting the composition and yield of milk - milk ejection reflex - Milking systems – Sanitary standards for the f quality milk – Cessation of milking, advances in herd management- raising calves – growing heifers, replacements and culling – marketing, Computerization of dairy enterprises.

UNIT VI: Advance in health management of dairy animals, metabolic diseases of high yielders- advances in preventive measures for production related diseases.
UNIT VII: Strategies to upgrade local cattle breeds for improving their productive and reproductive performances in Eastern UP.

LPM-702 Advances in Sheep and Goat Production and Management 3(2+1)

Theory:

UNIT I: Utility origin – Domestication - Numbers and distribution of meat and dual-purpose breeds - Methods of rearing – Range sheep production.
UNIT II: The farm flock – Pure bred flock - Management during breeding season – The sexual seasons and its control - Puberty – Time of the year to breed – Flushing – Ram-Ewe ratio.
UNIT III: Advances in feeding management, Nutrient deficiencies in range forage, Feed to supplement range forage, General feeding practices, feeding materials, Lamb feeding, Use of antibiotics and hormones, Hand feeding, Self- feeding, Pellet feeding, Feeding lambs and ewes during lactation.
UNIT IV: Recent development in sheep and goat management and their relevance under Indian economic conditions, needs and possibilities for future research.
UNIT V: Role of sheep husbandry in dry farming in India, Present development programmes in sheep and goat production, Advances in reproduction, housing, feeding and watering, diseases, Shearing methods and culling of sheep and goat.
UNIT VI: Role of goat in animal agriculture, Goat farming in India, selection of Breeding stock, Breeding problems, Housing, Principles of feeding, Practices, Crops and crop residues for goats, Milking practices.
UNIT VII: Studies on adaptation and performance of the various goat breeds reared in Eastern UP. Advances in care and management of goat breeds in new climatic zone.

Practical:

Study of population trend and structure - Visit to sheep and goat farms and critical analysis of various farm practices, Analysis of breeding, feeding, housing - Disease control management, management of young ones and maturing systems Estimation of fibre diameter medullation percentage crimps, tensile strength, Grease, pH and moisture content of wool - Score card and grading of wool. Study on the challenges faced by sheep and goat farmers of Eastern UP due to climate change and their possible solutions.

LPM -703 Advances in Swine Production and Management 3(2+1)

Theory:
UNIT I: The past, present and future of Swine production systems in India and production policies adopted in advanced countries.
UNIT II: Advances in breeding and selection – Prenatal and postnatal development Growth reproduction and lactation - Economic traits of swine production.
UNIT III: Advances in feeding and nutrition in pigs; automatic feeding and watering techniques, Feed stuffs, Energy, protein, minerals and vitamin sources, metabolic and nutritional disorders – Toxic substances.

UNIT IV: Advances in housing of pigs, environmental physiology - Infectious diseases and parasitism. reduction in new born piglet mortality.
UNIT V: Studies on various feeding strategies to reduce feed cost of pig farming in Eastern UP. Common difficulties faced by pig farmers in Eastern UP.

Practical:

Marketing - Study of population trend and structure. Analysis of breeding, feeding, housing, health care, farrowing management, summer management and special management principles practiced.

LPM -704 Advances in Laboratory Animal Production and Management 1(1+0)

Theory:

UNIT I: Importance and limitations of rabbits for meat and fur production, rats, mice & guinea pigs - Common breeds and strains.
UNIT II: Advances in system of housing, Common diseases and their control measure .
UNIT III: Breeding strategies - Age at maturity, litter size, Weaning, Feeding of growers, Selection of replacement stock, transportation of rabbit.
UNIT IV: Transportation of Laboratory animals – marketing of meat and fur.
UNIT V: Management of specific pathogen free and gnotobiotic animals ,concepts to related to welfare of laboratory animals
UNIT VI: Common diseases of laboratory animals, their control and management. Breeds of rabbit adaptable to Eastern UP.

Practical:

Visit to Rabbit farms - Study of the various chores in government farms and private farms - Critical analysis of breeding, feeding, disease control management and housing - Rabbit slaughter technique.

LPM-705 Advances in Poultry Production Management 3(2+1)

Theory:

UNIT I: Planning, organisation, executive and management of poultry farms and hatcheries of various sizes - alternative in poultry production
UNIT II: Demand, supply, present status of poultry production.
UNIT III: Problems and new management techniques in poultry for egg and meat in India vis-à-vis in other countries of the world, automation in poultry houses, management of specific pathogen free flocks.
UNIT IV: Poultry development policies and planning for higher production constraints in development and solutions, Ethology and entology in relation to poultry production.
UNIT V: Status of broiler and layer farming in Eastern UP. Various strategies for improving egg and meat production in UP.

Practical

Planning and preparation of research and commercial projects on broiler and layer production management. Studies of common disease outbreak in poultry of Eastern UP.

LPM-706 Advances in Environmental Management 2(1+1)

Theory:

UNIT I: The animal Industry and the quality of the environment – Management of the living environment - Microenvironment and macro environment.
UNIT II: Air Pollution: Indoor and out-door - Chemical, physical and bacteriological changes - Causes – Standards and the extent tolerated by animals - Effects on animal production.
UNIT III: Fixing standards in relation to CO2 - Air supply in relation to cubic space, temperature, air, velocity, relative humidity, dust particles, bacterial count, effective temperature and cooling power - Methods to get over pollution – Cleaning and washing - Air conditioning.
UNIT IV: Utilisation and disposal of animal waste, Health hazards, Waste utilization, technologies for processing and treatment of animal wastes, Health and economic impacts, Legal constraints, Microbiology of wastes, Waste properties ,Gases and odour.
UNIT V: Water Pollution: Significance, treatment and control - Funding agencies for animal welfare.
UNIT VI: Studies of air and water quality and their impact on livestock in Eastern UP. Various measures to improve air quality in Eastern UP. Adverse effect of air and water pollution on the performance and health of animals.

Practical:

Assessment of various factors in Indoor and outdoor environment- Assessment of CO2, air supply, dust particles and bacterial count in air - Visit to sewage treatment plant - Planning farm waste disposals - Physical chemical and bacteriological examination of water watering of farm animals.

LPM- 707 Advances in Equine Management 2(2+0)

UNIT I: New indigenous and exotic horses breeds- Types and classes of light and work horses
UNIT II: Advances in housing and routine management practices –Hygiene and maintenance of stable. Color and markings, Dentition and ageing selecting and judging horses- unsoundness and stable vices
UNIT III: New Feeding techniques and breeding of horses donkey and Mules, foaling, care of foal
UNIT IV: Foot care and shoeing care, Stud farms, Race clubs, Race horses and their care, Horse behaviour and training, Exercising ,Basic Horsemanship
UNIT V: Advances in health management & diseases control. Control of internal and external parasites of horse- Colic and its prevention
UNIT VI: Mode of transport, Facilities requirement, Cleaning, disinfection and preparation of vehicles Transport stress, Management during transport, Regulatory acts of states and Centre in animal disease control and welfare. Precautions and requirements before, during and after transport, Laws governing the import and export of livestock and its products, Horse passport and trading.

UNIT VII: Status of horse, mule and donkey population in Eastern UP. Various problems faced by equine keepers in Eastern UP.

PFE-512 Engineering Properties of Biological Material 3(2+1)

Theory:

Physical characteristics of different food grains, fruits and vegetables; Shape and size, description of shape and size, volume and density, porosity, surface area. Rheology; ASTM standard, terms, physical states of materials, classical ideal material, rheological models and equations, viscoelasticity, creep-stress relaxation, Non-Newtonian fluid and viscometry, rheological properties, force, deformation, stress, strain, elastic, plastic behaviour. Contact stresses between bodies, Hertz problems, firmness and hardness, mechanical damage, dead load and impact damage, vibration damage, friction, effect of load, sliding velocity, temperature, water film and surface roughness. Friction in agricultural materials, rolling resistance, angle of internal friction, angle of repose, flow of bulk granular materials, aero dynamics of agricultural products, drag coefficients, terminal velocity. Thermal properties: Specific heat, thermal conductivity, thermal diffusivity, methods of determination, steady state and transient heat flow. Electrical properties; Dielectric loss factor, loss tangent, A.C. conductivity and dielectric constant, method of determination, energy absorption from high frequency electric field. Application of engineering properties in design and operation of agricultural equipment and structures.

Practical:

Experiments for the determination of physical properties like, length, breadth, thickness, surface area, bulk density, porosity, true density, coefficient of friction, angle of repose and colour for various food grains, fruits, vegetables, spices and processed foods, aerodynamic properties like terminal velocity, lift and drag force for food grains, thermal properties like thermal conductivity, thermal diffusivity and specific heat, firmness and hardness of grain, fruits and stalk, electrical properties like dielectric constant, dielectric loss factor, loss tangent and A.C. conductivity of various food materials. Determination of different physical properties of locally available fruit crops.

PFE-522 Storage Engineering and Handling of Agricultural Products 3(2+1)

Theory:

Storage of grains, biochemical changes during storage, production, distribution and storage capacity estimate models, storage capacity models, ecology, storage factors affecting losses, storage requirements. Bag and bulk storage, godowns, bins and silos, rat proof godowns and rodent control, method of stacking, preventive method, bio-engineering properties of stored products, function, structural and thermal design of structures, aeration system. Grain markets, cold storage, controlled and modified atmosphere storage, irradiation, storage of dehydrated products, BIS standards. Physical factors influencing flow characteristics, mechanics of bulk solids, flow through hoppers, openings and ducts; design of belt, chain, screw, roller, pneumatic conveyors and bucket elevators; principles of fluidization; recent advances in handling of food materials.

Practical:

Quality evaluation of stored products, design of storage structures, cold storage, load estimation, construction, maintenance, static pressure drop, experiment on controlled and

modified atmosphere storage system, estimation of storage loss, and quality of stored products. Design and development of storage structure made up from locally available material suitable for storing agricultural products produced in eastern UP.

IDE-511 Agricultural Drainage System 3(2+1)

Theory:

Theories and applications of surface and sub-surface drainage, steady state. unsteady state drainage equations for layered and non-layered soils, horizontal sub-surface drainage. Principal and applications of Earnst, Glover Dumm, Kraijenhoff-van-de-leur equations Salt balance, leaching requirement and management practices under drained conditions. Design of different components of sub-surface drainage systems Theories of vertical drainage and multiple well point system. Disposal of drainage effluents, management of drainage projects of water logged and saline soils case.

Practical:

Measurement of in-situ hydraulic conductivity, estimation of drainage coefficient and leaching requirements, Delineation of waterlogged areas through isobar, isobaths and topographic maps of eastern UP. Design of surface and sub-surface drainage systems, design of fiber and envelop materials for eastern UP.

IDE-522 Ground Water Engineering 3(2+1)

Theory:

Properties affecting groundwater storage and movement, groundwater balance studies. Well hydraulics, two dimensional flow, steady and unsteady state flow in confined, unconfined and semi-confined aquifers, steady flow in sloping aquifers, partial penetrating wells. Analysis of multi-aquifers. Flow analysis in interfering wells. Pumping tests and determination of aquifer parameters. Groundwater modeling for water resources planning. Techniques for groundwater recharge.

Practical:

Preparation of Water table contour maps using software tools for eastern UP and determination of groundwater flow, estimation. of aquifer characteristics, problems on non-leaky and leaky aquifers, analysis of pumping test data; Computation of interference of wells; groundwater computer simulation models.

SWCE-511 Watershed Hydrology 3(2+1)

Theory:

Hydrologic processes and systems: Hydrologic problems of small watersheds; Hydrologic characteristics of watersheds Measurement and analysis of hydrologic parameters, rainfall models, stream flow measurement and analysis of data. Hydrograph analysis; Unit hydrograph theory, Synthetic and dimensionless hydrograph, convolution of unit hydrograph. Concept of hydraulic flood routing. flood routing (reservoir and channel routing). Definition and concept of different types of hydrologic models for simulation of hydrologic problems.

Practical:

Rainfall analysis, runoff computation, construction of hydrographs, Delineation of watershed, hydrograph analysis, reservoir and channel routing. Hydrologic models, visit to dam sites. Rainfall analysis of different stations of eastern UP. Delineation of different watersheds of eastern UP.

SWCE-512 Soil and Water Conservation Engineering 3(2+1)

Theory:

Probability and continuous frequency distribution: Fitting empirical distributions Layout and planning of soil and water conservation measures; Design principles of soil and water structures including contour bunds and terraces; Gully control measures. Hydraulic jump and energy dissipators for soil conservation structures; Hydrologic, hydraulic and structural design of drop structures. Sediment deposition process. Estimation of sediment load, earthen dams, seepage through dams and stability analysis. Rainwater harvesting. Flood control and stream bank protection measures.

Practical:

Design of Drop spillway, chute spillway, drop inlet spillway, hydraulic jump calculation, design of bench terrace, contour bunds and contour trenches, design and problems on earthen dam, silt detention tanks and check dams, visit to soil conservation structures sites. Study and visit of different soil and water conservation structures situated in eastern UP.

FMPE-513 Testing and Evaluation of Agricultural Equipment 3(2+1)

Theory:

Testing types, Procedures and various codes: National and International. Test equipment, usage and limitations. Laboratory and field testing of selected farm equipment Tractor testing performance evaluation and interpretation. Review and interpretation of test reports. Case studies and integrated system approach to machinery evaluation.

Practical:

Laboratory and field-testing of selected farm equipment viz. tiller, seed drill planter etc. and interpretation of test results. Material testing and accelerated testing of fast wearing components. Visits of industries of agricultural machinery is eastern UP.

FMPE-511 Design of Farm Power and Machinery 3(2+1)

Theory:

Research and development procedure in farm equipment and agricultural tractors. Design problems and application in typical farm equipment and other organizations. Design analysis from ethical point of view. Power transmission elements. Mechanical and hydraulic, selection, design analysis, applications and limitations. Use of computer aided design in farm equipment. Analysis of linkages in farm machinery and application to few selected equipment. Application of design principles in design and analysis of selected systems and components of farm equipment such as tillage, planting/harvesting etc. Design of rotary and oscillating machines Reliability criteria in design and its application.

Practical:

Design of gears, bearings, springs, hydraulic power transmission components etc. Solving design problems on farm machines and equipment and matching power unit. Study of reliability criteria in design and its application. Design of different hand tools and human driven machineries suitable for fields of eastern UP.

VMC- 602 Bacteriology – II 4(3+1)

Theory:

UNIT I: Systematic study of following pathogenic bacteria: Gram positive cocci, family *Micrococaceae*, endospore forming Gram positive rods and cocci, family *Bacillaceae*genus *Bacillus*, *Sporolactobacillus* and *Clostridium*. Spirochetes. Family *Spirochetaceae* and other families like *Spirillaceae*, coryneform bacteria, *Dermatophillaceae*, *Streptomycetaceae.* Systemic study of local bacterial isolates.

UNIT II: *Mycobacteria* and *Nocardia*, family *Actinomycetaceae*. Atypical prokaryotes such as *Chlamydia*, *Rickettsiae*, *Mycoplasma*, *Acholeplasma*, *Spiroplasma*, *Anaeroplasma*and *Thermoplasma*.

UNIT III: Regular non-sporing Gram positive rods such as *Listeria* and *Erysipelas*. Anaerobic Gram negative straight, curved and helical rods, family *Bacteriodaceae* and genus *Bacteroides* and *Fusobacterium*.

Practical:

Detailed and comparative study of morphology, biochemical reactions, physiology, serology and pathogenicity of various bacteria studied in theory, isolation of bacteria from field materials leading to their characterization and identification.

Detailed and comparative study of morphology, biochemical reactions, physiology, serology and pathogenicity of local bacterial isolates.

VMC 601 Veterinary Microbiology-1 4(3+1)

Theory:

UNIT I: Introduction to historical development of cellular organization, genetic & Chemical characteristics of eukaryotic and prokaryotic cells. Classification, nomenclature and identification; genetic characterization and numerical taxonomy. Bacterial cell structure, physiology and antigenic structure.

UNIT II: Determinants of pathogenicity and its molecular basis. Bacteriophages: temperate and virulent phages; lysogeny and lysogenic conversion. Bacterial genetics: bacterial variation, genetic transfer mechanisms (transformation, transduction and conjugation); plasmids, transposons and drug resistance; recombinant DNA technology.

UNIT III: Systemic study of following bacteria: Gram negative- aerobic rods and cocci, family *Pseudomonadaceae*, *Legionellaceae*, *Neisseriaceae*, and genus *Brucella*. Facultative anaerobic Gram negative rods, family- *Vibrionaceae*, *Pasteurellaceae*, *Enterobacteriaceae* and other genera. Systemic study of local bacterial isolates.

Practical:

Morphological characterization, cell fractionation, enrichment & isolation technology, various methods used in growth measurement and bacterial preservation, gene transfer experiment. Detailed characterization (biochemical, serological, pathogenicity) of bacteria.

VMC- 603 Veterinary Mycology 2(1+1)

Theory:

UNIT I: Morphology, physiology, reproduction, cultural characters, classification of fungi, immunology of pathogenic fungi.

UNIT II: Systematic study of animal mycoses such as aspergillosis, candidiasis, cryptococcosis, epizootic lymphangitis, mycetomas, sporotrichosis, histoplasmosis, blastomycosis, coccidioidomycosis, haplomycosis, rhinosporidiosis, zygomycosis, mycotic abortion, mycotic mastitis, mycotic dermatitis, dermatophytoses, mycotoxicosis etc.

Practical:

Collection and processing of clinical material for isolation of fungi. Study of gross and microscopic characters of pathogenic fungi. Detailed and comparative study of morphology, biochemical reactions, physiology, serology and pathogenicity of local isolates of Pathogenic fungi.

VMC 701 Advances in Bacteriology 3(2+1)

Theory:

UNIT I: Advanced studies on cytology, biochemical activities, antigenic structure and molecular biology of bacteria.

UNIT II: Advanced studies on pathogenicity, immunology and serology of bacteria.

Practical:

Biochemical, physiological and pathogenesis studies of various bacterial diseases**.** Biochemical, physiological and pathogenesis studies of local bacterial diseases**.**

VMC-706 Advances in Virology 3(2+1)

Theory:

UNIT I: Biology of RNA and DNA virus replication.

UNIT II: Current concepts in animal virus research with respect to viral structure and architecture, viral virulence, viral pathogenesis, persistence and oncogenesis.

UNIT III: Latest trends in the development of antivirals.

UNIT IV: Cloning and expression in viral vectors.

Practical:

Separation and characterization of viral proteins, and nucleic acid by polyacrylamide gel electrophoresis, column chromatography, blotting techniques. Problem oriented practical assignments using local material aimed at development of bio-reagents and relevant diagnostic tests. Screening and evaluation of antiviral agents for efficacy and toxicity.

VMC-707 Molecular and Genetic Aspects of Viral Pathogenesis
3(2+1)

Theory:

UNIT I: Mechanisms of viral infection and spread through the body; detailed study of virus host interactions.

UNIT II: Host immune responses to viral infections; viral strategies to evade host immune responses.

UNIT III: Pathogenesis of viral diseases of various systems; animal models for studying viral pathogenesis; molecular and genetic determinants of viral virulence; mechanisms of viral virulence.

UNIT IV**:** Molecular and genetic determinants of viral persistence, viral oncogenesis, viral immunosuppression, and immunopathology. Animal models for studying viral pathogenesis. To study the diversity in pathogenesis and immune response of local virus isolates.

Practical:

Pathotyping of animal viruses using Newcastle disease virus as model; Determination of immunosuppressive potential of animal viruses using infectious bursal disease virus/ Marek's disease virus/ chicken anemia virus; characterization of molecular determinants of viral virulence using variants, recombinants and reassortants; isolation and molecular characterization of viruses with varying virulence.

VMC-790 Special Problem 2(0+2)

Practical:

Short research problem(s) involving contemporary issues and research techniques. Research problems based on local requirements.

FRM 506 Remote Sensing and Gis for Fisheries Management 1(0+1)

Theory:

UNIT I: Basic terms and concepts; Electromagnetic radiation and its properties,atmospheric interactions, target interactions.

UNIT II: Sensor platforms – boats, balloons, air-crafts and satellites, Sensor systems– global acquisition systems and sequential acquisition systems.

UNIT III: Environmental satellites – The Landsat series, NOAA and IRS; Digitalimage processing and interpretation.

UNIT IV: Elements of GIS, Application of remote sensing and GIS to fisheries and aquaculture planning and development. Elements of GIS, Application of remote sensing and

GIS to fisheries andaquaculture planning and development in Uttar Pradesh.

Practical:
Study of satellite information, interpretation of satellite pictures for resource management, case studies on remote sensing and GIS applications.

AQC 505 Seed Production and Hatchery of Finfishes 3(2+1) Theory:

UNIT I: Introduction: History, constraints and current status of natural seedcollection and hatchery seed production.
UNIT II: Reproductive biology: Physiology and morphology; Molecular and physiological basis of reproduction, Overview of current developments in reproductive biology.
UNIT III: Gamete maturation and development: Spermatogenesis and oogenesis, Hormonal pathways and mode of control.
UNIT IV: Environmental and endocrine control of reproduction: Reproductive cycles, Seasonality (Photoperiod, change in water quality and quantity, temperature,lunar cycle, etc.), Environmental and exogenous hormonal stimuli.
UNIT V: Induced spawning: Methods of natural and artificial fertilization, GnRH andLinpe models, evaluation of milt and egg, cryopreservation technique, use ofdifferent synthetic hormones and analogues for induced spawning, Egg staging, Stripping and fertilization.
UNIT VI: Hatchery technology for different species: Indian major and minor carps, Exotic carps, Catfishes, Tilapia, Masheer, Trout, etc.
UNIT VII: Marine fish seed production: Seabass, milkfish, mullets, sea breams, rabbitfish, grouper, yellowtail, eel, cobia, etc.
UNIT VIII: Hatchery design and management: Criteria for site selection of hatchery and nursery, Design and function of incubators, Jar hatchery, Chinese hatchery and other hatchery systems- design and operation, hatchery protocols, larval rearing stages, rearing technology, packaging and transport of seed.
UNIT IX: Seed supply in aquaculture: Relationship between fry supply and grow-out, Macro- planning of fry production to stimulate grow-out, Marketing and economics of fish seed. Breeding techniques of low cost locally available fish of East Uttar Pradesh. Working mechanism of synthetic breeding hormone used in aquaculture. Major seed resources of Uttar Pradesh. Gears and Methods of natural seed collections in local area of East Uttar Pradesh. Factor affecting the availability of seed during the monsoon season. Problems in seed production techniques.

Practical:

Study of gonadal development in carps and other cultivable finfishes; Identification of carp and catfish seed; Collection and identification ofcultivable brackishwater finfish seed; Packing and transportation of cultivable finfish seed; Induced breeding of fishes through various inducingagents; Evaluation of carp milt and egg; Design and operation of Chinese hatchery; Preparation of brood and larval feed for different cultivable finfish; Rearing of carp spawn and fry; Visit to different finfish hatcheries.

FMPE-312 FARM MACHINERY AND EQUIPMENT-I
3(2+1)

Theory:
Introduction to farm mechanization. Classification of farm machines. Unit operations in crop production. Identification and selection of machines used in global agricultural practices for various operations on the farm. Hitching systems and controls of farm machinery. Calculation of field capacities and field efficiency. Calculations for economics of machinery usage, comparison of ownership with hiring of machines. Introduction to seed-bed preparation and its classification. Familiarization with land reclamation and earth moving equipment. Introduction to machines used for primary tillage, secondary tillage, rotary tillage, deep tillage and minimum tillage. Measurement of draft of tillage tools and calculations for power requirement for the tillage machines. Introduction to tillage machines like mould-board plough, disc plough, chisel plough, sub-soiler, harrows, cultivators, Identification of major functional components. Attachments with tillage machinery. Introduction to sowing, planting & transplanting equipment. Introduction to seed drills, no-till drills, and strip till drills. Introduction to planters, bed-planters and other planting equipment. Study of types of furrow openers and metering systems in drills and planters. Calibration of seed-drills/ planters. Adjustments during operation. Introduction to materials used in construction of farm machines. Heat treatment processes and their requirement in farm machines. Properties of materials used for critical and functional components of agricultural machines. Introduction to steels and alloys for agricultural application. Identification of heat treatment processes specially for the agricultural machinery components.

Practical:
Familiarization with different farm implements and tools. Study of hitching systems, Problems on machinery management. Study of primary and secondary tillage machinery – construction, operation, adjustments and calculations of power and draft requirements. Study of sowing and planting equipment – construction, types, calculation for calibration and adjustments. Study of transplanters – paddy, vegetable, etc. Identification of materials of construction in agricultural machinery and study of material properties. Study of heat treatment processes subjected to critical components of agricultural machinery. Performance evaluation and Calliberation of seed drill/ planters related to locally available/seasonally available seeds in the area of districts of eastern UP.

FMPE-321 Farm Machinery and Equipment-II
3(2+1)

Theory:
Introduction to plant protection equipment – sprayers and dusters. Classification of sprayers and sprays. Types of nozzles. Calculations for calibration of sprayers and chemical application rates. Introduction to intercultural equipment. Use of weeders – manual and powered. Study of functional requirements of weeders and main components. Familiarization of fertilizer application equipment. Study of harvesting operation – harvesting methods, harvesting terminology. Study of mowers – types, constructional details, working and adjustments. Study of shear type

harvesting
devices – cutter bar, inertial forces, counter balancing, terminology, cutting pattern. Study of reapers, binders and windrowers – principle of operation and constructional details. Importance
of hay conditioning, methods of hay conditioning, and calculation of moisture content of hay. Introduction to threshing systems – manual and mechanical systems. Types of threshing drums
and their applications. Types of threshers- tangential and axial, their constructional details and
cleaning systems. Study of factors affecting thresher performance. Study of grain combines, combine terminology, classification of grain combines, study of material flow in combines. Computation of combine losses, study of combine troubles and troubleshooting. Study of chaff
cutters and capacity calculations. Study of straw combines – working principle and constructional
details. Study of root crop diggers – principle of operation, blade adjustment and approach angle,
and calculation of material handled. Study of potato and groundnut diggers. Study of Cotton harvesting – Cotton harvesting mechanisms, study of cotton pickers and strippers, functional components. Study of maize harvesting combines. Introduction to vegetables and fruit harvesting equipment and tools.

Practical
Familiarization with plant protection and interculture equipment. Study of sprayers, types, functional components. Study of dusters, types and functional components. Calculations for chemical application rates. Study of nozzle types and spread pattern using patternator. Familiarization with manual and powered weeding equipment and identification of functional components. Study of fertilizer application equipment including manure spreaders and fertilizer
broadcasters. Study of various types of mowers, reaper, reaper binder. Study of functional components of mowers and reapers. Familiarization with threshing systems, cleaning systems in threshers. Calculations of losses in threshers. Familiarization with functional units of Grain combines and their types. Calculations for grain losses in a combine. Study of root crop diggers
and familiarization with the functional units and attachments. Familiarization with the working
of cotton and maize harvesters. Familiarization with vegetable and fruit harvesters. Performance evaluation of reaper binders for seasonally available crops in districts of Eastern UP.

REE-221 FUNDAMENTALS OF RENEWABLE ENERGY SOURCES 3(2+1)

Theory:
Concept and limitation of Renewable Energy Sources (RES), Criteria for assessing the potential of RES, Classification of RES, Solar, Wind, Geothermal, Biomass, Ocean energy sources, Comparison of renewable energy sources with non-renewable sources available

around the world. Solar Energy: Energy available from Sun, Solar radiation data, solar energy conversion into heat through, Flat plate and Concentrating collectors, different solar thermal devices, Principle of natural and forced convection drying system, Solar Photo voltaic: p-n junctions. Solar cells, PV systems, stand alone, Grid connected solar power station, Calculation of energy through photovoltaic power generation and cost economics. Wind Energy: Energy available from wind, General formula, Lift and drag. Basis of Wind energy conversion, Effect of density, Frequency variances, Angle of attack, Wind speed, Types of Windmill rotors, Determination of torque coefficient, Induction type generators, Working principle of wind power plant. Bio-energy: Pyrolysis of Biomass to produce solid, liquid and gaseous fuels. Biomass gasification, Types of gasifier, various types of biomass cook stoves for rural energy needs. Biogas: types of biogas plants, biogas generation, factors affecting biogas generation and usages, design consideration, advantages and disadvantages of biogas spent slurry.

Practical:

Study of different types of solar cookers, solar water heating system, natural convection solar dryer, forced convection solar dryer, solar desalination unit, solar greenhouse for agriculture production, biogas plants, biomass gasifiers, biomass improved cook-stoves, solar photovoltaic system. Dissemination of different renewable technologies such as solar cooker, solar PV system, Biomass Improved cook stoves, Biogas in the area of eastern UP.

REE-321 BIO ENERGY SYSTEMS: DESIGN AND APPLICATIONS 3(2+1)

Theory:

Fermentation processes and its general requirements, An overview of aerobic and anaerobic fermentation processes and their industrial application across India. Heat transfer processes in anaerobic digestion systems, land fill gas technology and potential. Biomass Production: Wastelands, classification and their use through energy plantation, selection of species, methods of field preparation and transplanting. Harvesting of biomass and coppicing characteristics. Biomass preparation techniques for harnessing (size reduction, densification and drying). Thermochemical degradation. History of small gas producer engine system. Chemistry of gasification.
Gas producer – type, operating principle. Gasifier fuels, properties, preparation, conditioning of producer gas. Application, shaft power generation, thermal application and economics. Trans esterification for biodiesel production. A range of bio-hydrogen production routes. Environmental aspect of bio-energy, assessment of greenhouse gas mitigation potential.

Practical:

Study of anaerobic fermentation system for industrial application, Study of gasification for industrial process heat, Study of biodiesel production unit, Study of biomass densification technique
(briquetting, pelletization, and cubing), Integral bio energy system for industrial application, Study of bio energy efficiency in industry and commercial buildings, Study and demonstration
of energy efficiency in building, Measuring efficiency of different insulation technique, Study of
Brayton, Striling and Rankine cycles, Study of modern greenhouse technologies. Assessment of Biomass energy available in districts of eastern UP. Biomass densification from locally available Biomass such as paddy/wheat straw.

SWCE-221 WATERSHED HYDROLOGY
2(1+1)

Theory:
Hydrologic cycle, precipitation and its forms, rainfall measurement and estimation of mean rainfall in local areas, frequency analysis of point rainfall. Mass curve, hyetograph, depth-area-duration curves and intensity-duration-frequency relationship. Hydrologic processes- Interception, infiltration –factors influencing, measurement and indices. Evaporation - Estimation and measurement. Runoff -factors affecting, measurement, stage - discharge rating curve, estimation of peak runoff rate and volume, Rational method, Cook's method and SCS curve number method. Geomorphology of watersheds – Linear, aerial and relief aspects of watersheds- stream order, drainage density and stream frequency. Hydrograph - Components, base flow separation, unit hydrograph theory, S-curve, synthetic hydrograph, applications and limitations. Stream gauging - discharge rating curves, flood peak, design flood and computation of probable flood. Flood routing – channel and reservoir routing. Drought – classification, causes and impacts, drought management strategy.

Practical:
Visit to meteorological observatory and study of different instruments. Design of rain gauge network. Exercise on intensity - frequency - duration curves. Exercise on depth - area – duration and double mass curves. Analysis of rainfall data and estimation of mean rainfall by different methods. Exercise on frequency analysis of hydrologic data and estimation of missing data, test for consistency of rainfall records. Exercise on computation of infiltration indices. Computation of peak runoff and runoff volume by Cook's method and rational formula. Computation of runoff volume by SCS curve number method. Study of stream gauging instruments - current meter and stage level recorder. Exercise on geomorphic parameters of watersheds. Exercise on runoff hydrograph. Exercise on unit hydrograph. Exercise on synthetic hydrograph. Exercise on flood routing. Study and Analysis of rainfall data of districts of eastern UP., delineation and prioritization of *Saryu* and *Tamsa* river basin of eastern UP

SWCE-311 SOIL AND WATER CONSERVATION ENGINEERING
3(2+1)

Theory:
Soil erosion - Introduction, causes and types - geological and accelerated erosion, agents, factors affecting and effects of erosion in local areas. Water erosion - Mechanics and forms - splash, sheet, rill, gully, ravine and stream bank erosion. Gullies - Classification, stages of development. Soil loss estimation – Universal soil loss equation (USLE) and modified USLE. Rainfall erosivity- estimation by KE>25 and EI30 methods. Soil erodibility - topography, crop management and conservation practice factors applicable to local agricultural areas. Measurement of soil erosion – unoff plots, soil samplers. Water erosion control measures - agronomical measures - contour farming, strip cropping, conservation tillage and mulching. Engineering measures– Bunds and terraces. Bunds - contour and graded bunds - design and surplussing arrangements. Terraces - level and graded broad base terraces, bench terraces - planning, design and layout procedure, contour stonewall and trenching. Gully and ravine reclamation - principles of gully control - vegetative measures, temporary structures and diversion drains. Grassed waterways and design. Wind erosion- Factors affecting, mechanics,

soil loss estimation and control measures - vegetative, mechanical measures, wind breaks and shelter belts and stabilization of sand dunes. Land capability classification. Rate of sedimentation, silt monitoring and storage loss in tanks.

Practical:

Study of different types and forms of water erosion. Exercises on computation of rainfall erosivity index. Computation of soil erodibility index in soil loss estimation. Determination of length of slope (LS) and cropping practice (CP) factors for soil loss estimation by USLE and MUSLE. Exercises on soil loss estimation/measuring techniques. Study of rainfall simulator for erosion assessment. Estimation of sediment rate using Coshocton wheel sampler and multislot devisor. Determination of sediment concentration through oven dry method. Design and layout of contour bunds. Design and layout of graded bunds. Design and layout of broad base terraces. Design and layout of bench terraces. Design of vegetative waterways. Exercises on rate of sedimentation and storage loss in tanks. Computation of soil loss by wind erosion. Design of shelterbelts and wind breaks for wind erosion control. Visit to soil erosion sites and watershed project areas for studying erosion control and water conservation measures. Determination of sediment concentration of Tamsa River through one drive method, Visit to soil erosion sites and watershed project areas for studying erosion control and water conservation measures of eastern UP.

SWCE-321 WATER HARVESTING AND CONSERVATION STRUCTURES 3(2+1)

Theory:

Water harvesting -principles, importance and issues. Water harvesting techniques – classification based on source, storage and use. Runoff harvesting – short-term and long-term techniques. Short-term harvesting techniques - terracing and bunding, rock and ground catchments. Long term harvesting techniques - purpose and design criteria. Structures - farm ponds - dug-out and embankment reservoir types, tanks and subsurface dykes. Farm pond - components, site selection, design criteria, capacity, embankment in local areas, mechanical and emergency spillways, cost estimation and construction. Percolation pond - site selection, design and construction details. Design considerations of *nala* bunds. Soil erosion control structures-introduction, classification and functional requirements. Permanent structures for soil conservation and gully control-check dams, drop, chute and drop inlet spillways - design requirements, planning for design, design procedures - hydrologic, hydraulic and structural design and stability analysis. Hydraulic jump and its application. Drop spillway - applicability, types - straight drop, box-type inlet spillways - description, functional use, advantages and disadvantages, straight apron and stilling basin outlet, structural components and functions. Loads on head wall, variables affecting equivalent fluid pressure, triangular load diagram for various flow conditions, creep line theory, uplift pressure estimation, safety against sliding, overturning, crushing and tension. Chute spillway - description, components, energy dissipaters, design criteria of Saint Antony Falls (SAF) stilling basin and its limitations. Drop inlet spillway - description, functional use and design criteria.

Practical:
Study of different types of farm ponds. Computation of storage capacity of embankment type
of farm ponds. Design of dugout farm ponds. Design of percolation pond and *nala* bunds. Runoff
measurement using H-flume. Exercise on hydraulic jump. Exercise on energy dissipation in water flow. Hydrologic, hydraulic and structural design of drop spillway and stability analysis. Design of SAF stilling basins in chute spillway. Hydrologic, hydraulic and structural design of drop inlet
spillway. Design of small earthen embankment structures. Practice on softwares for design of
soil and water conservation structures. Field visit to watershed project areas treated with soil and
water conservation measures / structures. Design of farm pond suitable for districts of eastern UP.

IDE 221 IRRIGATION ENGINEERING
3(2+1)

Theory:
Irrigation Engineering: Irrigation, impact of irrigation of Human Enviornment, some major and medium irrigation schemes of India, purpose of irrigation, sources of irrigation water, present status of development and utilization of different water resources of the country; Measuremnt of irrigation water, weir, noticfhes, flumes and orfices and other methods; water conveyance, design of irrigation field channels, underground pipe conveyance system, irrigations tructures, channellining; land grading, different design methods and estimation of earth work and cost; soil water plant relationship, soil water movement, infiltration, evapotranspiration, soil moisture constant, depth of irrigation, frequency of irrigation, irrigation efficiencies; surface irrigation methods of water application, border, check basi, furrow and contour irrigation; frequency of irrigation, irrigation efficiencies; surface irrigation methods of water application, border, check basin, furrow and contour irrigation; sprinkler and dirp irrigation method, merits, demerits, selection and design; Participatory irrigation management. Economics of water resources utilization.
Practical: Measurement of soil moisture by different soil moisture measuring instruments; measurement of irrigation water; measurement of infiltration rate; computation of evaporation and transpiration; land grading exercises; design of under ground pipe line system; infiltration-advance in border irrigation; measurement of advance and recession in border irrigation and estimation of irrigation efficiency; measurement of advance and recession in furrow irrigation and estimation of irrigation efficiency; measurement of uniformity coefficient of drip irrigation method; field problems and remedial measures for sprinkler and drip irrigation method. Estimation of evapo-traspiration and infiltration of districts of eastern UP. Estimation of irrigation efficiency of local farm.

IDE-222 SPRINKLER AND MICRO IRRIGATION SYSTEMS
2(1+1)

Theory:
Sprinkler irrigation: adaptability, problems and prospects, types of sprinkler irrigation systems; design of sprinkler irrigation system: layout selection, hydraulic design of lateral,

sub main and main pipe line, design steps; selection of pump and power unit for sprinkler irrigation system; performance evaluation of sprinkler irrigation system: uniformity coefficient and pattern efficiency; Micro Irrigation Systems: types-drip, spray, & bubbler systems, merits and demerits, different components; Design of drip irrigation system: general considerations, wetting patters, irrigation requirement, emitter selection, hydraulics of drip irrigation system, design steps; necessary steps for proper operation of a drip irrigation system; maintenance of micro irrigation system: clogging problems, filter cleaning, flushing and chemical treatment; fertigation: advantages and limitations of fertigation, fertilizers solubility and their compatibility, precautions for successful fertigation system, fertigation frequency, duration and injection rate, methods of fertigation.

Practical:
Study of different components of sprinkler irrigation system; design and installation of sprinkler irrigation system; determination of precipitation pattern, discharge and uniformity coefficient; cost economics of sprinkler irrigation system; study of different components of drip irrigation; design and installation of drip irrigation system; determination of pressure discharge relationship and emission uniformity for given emitter; study of different types of filters and determination of filtration efficiency; determination of rate of injection and calibration for chemigation/fertigation; design of irrigation and fertigation schedule for crops; field visit to micro irrigation system and evaluation of drip system; cost economics of drip irrigation system.cost economics of drip and sprinkler irrigation system installed in district of eastern UP.

PFE-312 POST HARVEST ENGINEERING OF CEREALS, PULSES AND OIL SEED 3(2+1)

Theory:
Cleaning and grading, aspiration, scalping; size separators, screens, sieve analysis, capacity and effectiveness of screens. Various types of separators: specific gravity, magnetic, disc, spiral,
pneumatic, inclined draper, velvet roll, colour sorters, cyclone, shape graders. Size reduction: principle, Bond's law, Kick's law, Rittinger's law, procedure (crushing, impact, cutting and shearing), Size reduction machinery: Jaw crusher, Hammer mill, Plate mill, Ball mill. Material
handling equipment. Types of conveyors: Belt, roller, chain and screw. Elevators: bucket, Cranes
& hoists. Trucks (refrigerated/ unrefrigerated), Pneumatic conveying. Drying: moisture content
and water activity; Free, bound and equilibrium moisture content, isotherm, hysteresis effect, EMC determination, Psychrometric chart and its use in drying, Drying principles and theory, Thin layer and deep bed drying analysis, Falling rate and constant rate drying periods, maximum
and decreasing drying rate period, drying equations, Mass and energy balance, Shedd's equation,
Dryer performance, Different methods of drying, batch-continuous; mixing-non-mixing, Sunmechanical, conduction, convection, radiation, superheated steam, tempering during drying,
Different types of grain dryers: bin, flat bed, LSU, columnar, RPEC, fluidized, rotary and tray.
Mixing: Theory of mixing of solids and pastes, Mixing index, types of mixers for solids,

liquid
foods and pastes. Milling of rice: Conditioning and parboiling, advantages and disadvantages, traditional methods, CFTRI and Jadavpur methods, Pressure parboiling method, Types of rice mills, Modern rice milling, different unit operations and equipment. Milling of wheat, unit operations and equipment. Milling of pulses: traditional milling methods, commercial methods,
pre-conditioning, dry milling and wet milling methods: CFTRI and Pantnagar methods. Pulse milling machines, Milling of corn and its products. Dry and wet milling. Milling of oilseeds: mechanical expression, screw press, hydraulic press, solvent extraction methods, preconditioning
of oilseeds, refining of oil, stabilization of rice bran., Extrusion cooking: principle, factors affecting,
single and twin screw extruders. By-products utilization.

Practical:
Performance evaluation of different types of cleaners and separators, Determination of separation efficiency, Study of different size reduction machines and performance evaluation, Determination of fineness modulus and uniformity index, Study of different types of conveying
and elevating equipments, Study of different types of mixers. Measurement of moisture content:
dry basis and wet basis, Study on drying characteristics of grains and determination of drying constant, Determination of EMC (Static and dynamic method), Study of various types of dryers,
Study of different equipments in rice mills and their performance evaluation, Study of different
equipments in pulse mills and their performance evaluation, Study of different equipments in oil mills and their performance evaluation, Type of process flow charts with examples relating to
processing of cereals pulses and oil seeds, Visit to grain processing industries. Processing of wheat ,rice , pigeon pea and mustard seeds cultivated from eastern UP

PFE-321 POST HARVEST ENGINEERING OF HORTICULTURAL CROPS 2(1+1)

Theory:
Importance of processing of fruits and vegetables, spices, condiments and flowers. Characteristics and properties of horticultural crops important for processing, Peeling: Different peeling methods and devices (manual peeling, mechanical peeling, chemical peeling, and thermal peeling), Slicing of horticultural crops: equipment for slicing, shredding, crushing, chopping, juice extraction, etc., Blanching: Importance and objectives; blanching methods, effects on food (nutrition, colour, pigment, texture), Chilling and freezing: Application of refrigeration in different perishable food products, Thermophilic, mesophilic & Psychrophilic micro-organisms, Chilling requirements of different fruits and vegetables, Freezing of food, freezing time calculations, slow and fast freezing, Equipment for chilling and freezing (mechanical & cryogenic), Effect on food during chilling and freezing, Cold storage heat load calculations and cold storage design, refrigerated vehicle and cold chain system, Dryers for fruits and vegetables, Osmo-dehydration, Packaging of horticultural commodities, Packaging requirements (in terms of light transmittance, heat, moisture and gas proof, micro organisms, mechanical strength), Different types of packaging materials commonly used for raw and processed fruits and vegetables products, bulk and retail

packages and packaging machines, handling and transportation of fruits and vegetables, Pack house technology, Minimal processing, Common methods of storage, Low temperature storage, evaporative cooled storage, Controlled atmospheric storage, Modified atmospheric packaging, Preservation Technology, General methods of preservation of fruits and vegetables, Brief description and advantages and disadvantages of different physical/ chemical and other methods of preservation, Flowcharts for preparation of different finished products, Important parameters and equipment used for different unit operations, Post harvest management and equipment for spices and flowers, Quality control in fruit and vegetable processing industry. Food supply chain. .

Practical:

Performance evaluation of peeler and slicer, Performance evaluation of juicer and pulper, Performance evaluation of blanching equipment, Testing adequacy of blanching, Studey of cold storage and its design, Study of CAP and MAP storage, Minimal processing of vegetables, Prepartaion of value added products, Visit to fruit and vegetable processing industry, Visit to spice processing plant. Preparation of value added products from locally available fruits and vegetables such as guava, mango, amla, potato, carrot etc. available in districts of eastern UP