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Research Ethics In The Research Methodology Course Work

S.no	Course Code	Course Title	Credit
1.	PGS 513 (e –course)	AGRICULTURAL RESEARCH, RESEARCH ETHICS AND RURAL DEVELOPMENT PROGRAMMES	1(0+1)
2.	SAF- 610	RESEARCH METHODOLOGY IN FORESTRY	3(2+1)
3.	VS - 613	RESEARCH METHODS IN VEGETABLE PRODUCTION	2(0+2)
4.	PP-617	ADVANCED TECHNIQUES IN PLANT PROTECTION	2(0 +2)
5.	STAT-621	ADVANCE DESIGN OF EXPERIMENTS-I	2(1+1)
6.	STAT-622	ADVANCE DESIGN OF EXPERIMENTS-II	2(1+1)
7.	ENT-624	MOLECULAR APPROACHES IN ENTOMOLOGICAL RESEARCH (PREREQUISITE: BASIC COURSE IN MOLECULAR BIOLOGY BIOCHEMISTRY)	2(1+1)
8.	SS-615	TECHNIQUES OF SOIL RESEARCH AND INSTRUMENTATION	3(2+1)
9.	AE-614	OPERATIONS RESEARCH IN AGRICULTURE - L	3 (2+1)
10.	AE-623	OPERATIONAL R E SE ARCH IN AGRICULTURE - II	3(2+1)
11.	VMD -511	ANIMAL WELFARE ETHICS AND JURISTRUDENCE	2(2+0)

Dean
(Post Graduate Studies)

PGS-513 AGRICULTURAL RESEARCH, RESEARCH ETHICS AND RURAL DEVELOPMENT PROGRAMMES (1+0)

Objective - To enlighten the students about the organization and functioning of agricultural research systems at national and international levels, research ethics, and rural development programmes and policies of Government.

Theory

UNIT I History of agriculture in brief; Global agricultural research system: need, scope, opportunities; Role in promoting food security, reducing poverty and protecting the environment; National Agricultural Research Systems (NARS) and Regional Agricultural Research Institutions; Consultative Group on International Agricultural Research (CGIAR): International Agricultural Research Centres (IARC), partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels; International fellowships for scientific mobility.

UNIT II Research ethics: research integrity, research safety in laboratories, welfare of animals used in research, computer ethics, standards and problems in research ethics.

UNIT III Concept and connotations of rural development, rural development policies and strategies. Rural development programmes: Community Development Programme, Intensive Agricultural District Programme, Special group – Area Specific Programme, Integrated Rural Development Programme (IRDP) Panchayati Raj Institutions, Co-operatives, Voluntary Agencies/NonGovernmental Organisations. Critical evaluation of rural development policies and programmes. Constraints in implementation of rural policies and programmes.

SAF- 610 RESEARCH METHODOLOGY IN FORESTRY 3(2+1)

Theory

Unit I

Experimental Design: Research problem. Types of Research. Need for designing of experiments, Basic principles of design of experiment. Uniformity trials, size and shape of plots and blocks; Analysis of variance, Completely Randomized Design, Randomized Block Design and Latin Square Design. Factorial experiments, (symmetrical as well as asymmetrical). Confounding in symmetrical factorial experiments, Factorial experiments with control treatment. Split plot and strip plot designs; Analysis of covariance and missing plot techniques. Balanced incomplete block design, Fitting of response surfaces. Transformations of data. Groups of experiments.

Unit II

Sampling Theory: Basic terms used in sampling. Simple random sampling, Stratified random sampling, Systematic random sampling. Elementary idea of probability proportional to size, multistage, cluster and inverse sampling.

Unit III

Elementary idea to multivariate analytical tools- Classification and Discriminant function. Factor analysis, Principal component and cluster analysis.

Practical

Analysis of data obtained from CRD, RBD, LSD; • Analysis of factorial experiments without and with confounding; • Analysis with missing data; • Split plot and strip plot designs; • Transformation of data; Fitting of response surfaces. Balanced incomplete block design; • Groups of experiments. Simple random sampling, Stratified random sampling, Systematic random sampling.

VS - 613 RESEARCH METHODS IN VEGETABLE PRODUCTION 2(0+2)
Practical

Recent advances in vegetable growing. Research methodology for leaf and tissue analysis. Quality evaluation of vegetables. Bioassay studies. Handling of various laboratory equipments.

PP - 617 ADVANCED TECHNIQUES IN PLANT PROTECTION 2(0 +2)

Pest control equipment, principles, operation, maintenance, selection, application of pesticides and biocontrol agents, seed dressing, soaking, root dip treatment, dusting spraying (Low and high volume sprayers) Application through irrigation water. Soil disinfestation: soil fumigation sterilization, solarization, deep ploughing (summer), flooding (stagnent water treatment). Techniques to check the spread of pest through seed, bulbs, cutting, and cut flowers, Physical cleaning cutting and removal of infected parts, hot water treatment. Use of light, transmission and scanning electron microscopy. Protein isolation from the pest/pathogen and host plant and its quantification using spectrophotometer and molecular weight determination using SDS PAGE. DNA isolation from the pest/pathogen and host plant and its quantification. RFLP and RAPD studies of the isolated DNA. Use of tissue culture its techniques in plant protection. Computer application for predicting/ forecasting pest/ disease attack and identification. Statistical design for plant protection experiment.

STAT - 621 ADVANCE DESIGN OF EXPERIMENTS-I 2(1+1)

General properties and analysis ofblock designs. Balancing criteria. M-associate PBIB designs and their association schemes including lattice designs-properties and construction. Construction of mutually orthogonal latin squares, Designs for two-way elimination of heterogeneity including lattice square designs. Weighting designs, Augmented designs, optimality criteria and optimality of designs, robustness of designs. Response surface designs - Symmetrical and asymmetrical factorials, Response optimization and slope estimation, Blocking. Canonical analysis and ridge analysis. Experiments with mixtures: design and analysis

STAT- 622 ADVANCE DESIGN OF EXPERIMENTS-II 2(1+1)

Factorial experiments, Orthogonal and balanced arrays, Factorial replication, Regular and irregular fractions, Balanced factorial experiments-characterization and analysis (symmetrical and asymmetrical factorials).

ENT-624 MOLECULAR APPROACHES IN ENTOMOLOGICAL RESEARCH (PREREQUISITE: BASIC COURSE IN MOLECULAR BIOLOGY BIOCHEMISTRY) 2(1+1)

Introduction to molecular biology. Techniques used in molecular biology. DNA and RNA analysis in insects-transcription and translation mechanisms, DNArecombinant technology, identification of genes/nucleotide sequences for characters of interests. Genes of interest in entomological research - marker genes for sex identification, neuropeptides, JH esterase, BT toxins and venoms, chitinase, CPTI, lectins and proteases. Insect gene transformation. Biotechnology in relation to silk worms and honey bees. Introduction of lectin genes for pest suppression. DNA finger printing for taxonomy and phylogeny. DNAbased diagnostics. Insect immune systems in comparison to vertebrates. Molecular basis of metamorphosis. BT transgenics technology and implications. Molecular biology of baculovinuses, insecticide resistance. Molecular aspects of insect diseases. Molecular aspects of insect host, parasitoid and host piant interaction.

Practical

Isolation of DNA/RNA, purity determinations, base pair estimation, agarose gel electrophoresis, restriction mapping of DNA, demonstration of PCR, RFLP and RAPD echniques.

SS-615 TECHNIQUES OF SOIL RESEARCH AND INSTRUMENTATION 3(2+1)

Techniques of pots and sand cultures and field experimentation. Beer's, Lambert laws and its application. Flame photometry, potentiometery Nernst equation and ion selective electrodes, potentiometric titration, conductivity and conductometric titration, ion exchange chromatography, atomic absorption spectrophotometery, RF value, polarography and its application in soil.

Practical

Determination of nutrients in soil and plant, potentiometric titrations, ion ductometric titration, EME of cell and electrode

AE - 614 OPERATIONS RESEARCH IN AGRICULTURE - L 3 (2+1)

Nature, scope and subject matter of operation research, models concept, construction and solution of models. Extension of linear programming variable-price programmine variable resouce programming, Integer programming, dynamic programming, recursive programming, relation between linear and dynamic programming, quadratic programming Inventory models Elementary models with and without price breaks, and restrictions. Application of inventory models in agriculture. Spatial equilibrium models, The assignment problem with some models in agriculture. Spatial equilibium models, The assignment problem with some models in agriculture. Spatial equilibrium models, The assignmem problem with some illustrations of allocationn problems, including transporation problems. Treatment of risks and uncertainties.

AE - 623 OPERATIONAL RESEARCH IN AGRICULTURE - II 3(2+1)

The system approach: System terminology, categories of models static and dynamic deterministic models, static and dynamic stochastic models, system analysis. System components, methods related stops, alternate categories of models. L-System analysis relationships from empirial datea system synthesis Markov Chanin process, input-outpur analysis, economics, models ensitivity, statistical assessment, Decision theory Introduction decision analysis, concepts of utility and non-linear preference, Bernoullon pnn unidimentional utilities, multidimensional utilities, procedures for decision analysis, 18 series, approximation of utility functions, portfolio-like analysis, risk response analysis.

VMD- 511 JURISPRUDENCE, ETHICS, AND ANIMAL WELFARE 2(2+0)

Legal duties of veterinarians, laws related to medicine, evidence, common offences against animals and laws related to these offences. Examination of living and dead animals in criminal cases. Cruelty to animals and bestiality. Legal aspects of: Examination of animals for soundness, examination of injuries and post-mortem examination. Causes of sudden death in animals. Collection and despatch of materials for chemical examination, detection of frauds-doping, alteration of description, bishoping etc. Cattles Slaughter and evidence procedure in courts. Provincial und Central Acts relating to animals. Glanders and Farcy Act 1899 (13 of 1899). Dourine Act 1910 (5 of 1910). Laws relating to offences affecting Public Health. Laws relating to poisons and adulteration of drugs. Livestock importation act, liability and insurance. Code of conduct and ethics for veterinarians the regulations made under the Act. Animal welfare organizations and its role in animal welfare, welfare assessment, behaviour and animal welfare principles and philosophy

of animal welfare, animal welfare ethics, improving animal welfare through legislation and incentives, assessment of physiological, behavioural, disease and production measures of animal welfare, assessing welfare in practice, environment enrichment, cuthanasia, welfare of animals used in education and research and transportation, religion and animal welfare, human and animal welfare conflict, veterinary disaster management human-animal interactions, economics and animal welfare and veterinarians as animal welfare educators.