

Syllabus of Research Methodology for RET in Agriculture

Unit 1: Concepts of research methodology

Importance and scope of research in agriculture. Types of research: Fundamental vs. Applied. Concept of researchable problem, Research prioritization, Selection of research problem. Approach to research, Research process.

Unit 2: Hypothesis Testing

Hypothesis- meaning- characteristics- types of hypotheses- Review of literature, Setting of course objectives and Hypothesis, Testing of hypothesis, z, t, chi-square and f-distribution

Unit 3: Data collection and descriptive analysis

Data- meaning, assessment of data needs, sources of data collection, collection of data in different fields of agriculture. Types of data, Classification, tabulation, and graphical representation of data, measures of central values, measures of dispersion, correlation and regression analysis.

Unit 4: Sampling


Sampling Theory and sampling design, methods of sampling; probability and non-probability sampling methods, Research design and techniques, Types of research design.

Unit 5: Probability

Theory of probability, Random experiment, Mathematical or classical definition of probability, Statistical definition of probability, conditional probability, Mathematical expectation.

Unit 6: Data analysis

Data coding, cleaning, transformation of data, Universal procedures for preparation of bibliography, writing of research articles, Project proposal, Introduction to ANOVA: One way and two-way, Introduction to SPSS















अधिष्ठाता
कृषि संकाय

दी०द०३० गोरखपुर विश्वविद्यालय, गोरखपुर



Unit-II

:07

Unit-III

:07

Unit-IV

:07

Unit-V

:07

SYLLABUS FOR RESEARCH ENTRANCE TEST (RET)

AGRONOMY

PAPER-II

(SUBJECT CONTENT)

Unit I:

Modern Concepts in Crop Production

- 1 - Quantitative agro-biological principles and inverse yield nitrogen law; Mitscherlich Yield equation, its interpretation and applicability; Baule unit.
- 2 - Effect of lodging in cereals; physiology of grain yield in cereals; optimization of Plant population and planting geometry in relation to different resources, concept of ideal plant type and crop modeling for desired crop yield.
- 3 - Scientific principles of crop production; crop response production functions; concept of soil plant relations; yield and environmental stress, use of growth hormones and regulators for better adaptation in stressed condition.
- 4 - Integrated farming systems, organic farming, and resource conservation technology including modern concept of tillage; dry farming; determining the nutrient needs for yield potentiality of crop plants, concept of balance nutrition and integrated nutrient management; precision agriculture.
- 5 - Modern crop production concepts: soil less cultivation, Aeroponic, Hydroponic, Robotic and terrace farming. use of GIS, GPS and remote sensing in modern agriculture, precision farming and protected agriculture.

Unit - II

Principles and Practices of Weed Management

- 1- Weed biology, and ecology and classification, crop-weed competition including allelopathy; principles and methods of weed control and classification management; weed indices, weed shift in different eco-systems
- 2 - Herbicides introduction and history of their development; classification based on chemical, physiological application and selectivity; mode and mechanism of action of herbicides.
- 3 - Herbicide structure - activity relationship; factors affecting the efficiency of herbicides; herbicide formulations, herbicide mixtures, sequential application of herbicides, rotation; weed control through use of nano-herbicides and bio-herbicides,

myco-herbicides bio-agents, and allelochemicals; movement of herbicides in soil and plant, Degradation of herbicides in soil and plants; herbicide resistance, residue, persistence and management; development of herbicide resistance in weeds and crops and their management, herbicide combination and rotation.

4 - Weed management in major crops and cropping systems; alien, invasive and parasitic weeds and their management; weed shifts in cropping systems; aquatic and perennial weed control; weed control in non-crop area.

5 - Integrated weed management; recent development in weed management- robotics, use of drones and aeroplanes, organic etc., cost: benefit analysis of weed management.

Unit - III

Principles and Practices of Water Management

1 - Water and its role in plants; Irrigation: Definition and objectives, water resources and irrigation development in India and the concerned state, major irrigation projects, extent of area and crops irrigated in India and in different states.

2 - Water cycle, water movement in soil and plants; transpiration; soil-water-plant relationships; water absorption by plants; plant response to water stress, crop plant adaptation to moisture stress condition. Water availability and its relationship with nutrient availability and losses

3 - Soil, plant and meteorological factors determining the water needs of crops, scheduling, depth and methods of irrigation; micro irrigation systems; deficit irrigation; fertigation; management of water in controlled environments and polyhouse. Irrigation efficiency and water use efficiency.

4 - Water management of crops and cropping system, Quality of irrigation water and management of saline water for irrigation, water use efficiency, Crop water requirement- estimation of ET and effective rainfall; Water management of the major crops and cropping systems.

5 - Excess of soil water and plant growth; water management in problem soils, drainage and methods of field drainage, Soil moisture conservation, water harvesting.

Unit IV

Agronomy of Major Crops

Origin and history, area and production, classification, improved varieties, adaptability, climate, soil, water and cultural requirements, nutrition, quality components, handling and processing of the produce for maximum production of:

1 - Cereal Crops

2 - Pulse Crops

3 - Oilseed Crops

4 - Commercial and Forage Crops

5 - Forage Crops

Unit V

Principles and Practices of Soil Fertility and Nutrient Management

1 - Soil fertility and productivity - factors affecting; features of good soil management; problems of supply and availability of nutrients; relation between nutrient supply and crop growth; organic farming - basic concepts and definitions.

2 - Criteria of essentiality of nutrients; Essential plant nutrients – their functions, nutrient deficiency symptoms; transformation and dynamics of major plant nutrients.

3 - Preparation and use of farmyard manure, compost, green manures, vermicompost, biofertilizers and other organic concentrates their composition, availability and crop responses; recycling of organic wastes and residue management. Soil less cultivation.

4 - Commercial fertilizers; composition, relative fertilizer value and cost; crop response to different nutrients, residual effects and fertilizer use efficiency; agronomic, chemical and physiological, fertilizer mixtures and grades; methods of increasing fertilizer use efficiency; nutrient interactions.

5 - Time and methods of manures and fertilizers application; foliar application and its concept; relative performance of organic and inorganic nutrients; economics of fertilizer use; integrated nutrient management; use of vermicompost and residue wastes in crops.

Unit - VI

Principles of Organic Farming and Sustainable Agriculture

1 - Organic farming - concept and definition, its relevance to India and global agriculture and future prospects; principles of organic agriculture; organics and farming standards; organic farming and sustainable agriculture; selection and conversion of land, soil and water management - land use, conservation tillage; shelter zones, hedges, pasture management, agro-forestry.

2 - Organic farming and water use efficiency; soil fertility, nutrient recycling, organic residues, organic manures, composting, soil biota and decomposition of organic residues, earthworms and vermicompost, green manures, bio-fertilizers and biogas technology.

3 - Farming systems, selection of crops and crop rotations, multiple and relay cropping systems, intercropping in relation to maintenance of soil productivity. Control of weeds, diseases and insect pest management, biological agents and pheromones, bio-pesticide.

4 - Socio-economic impacts; marketing and export potential: inspection, certification, labeling and accreditation procedures; organic farming and national economy.

5 - Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation.

Unit VII

Cropping System, Dry Land Agriculture and Watershed Management

1 - Cropping systems: definition, indices and its importance; physical resources, soil and water management in cropping systems; assessment of land use.

2 - Definition, concept and characteristics of dry land farming; dry land versus rainfed farming; significance and dimensions of dry land farming in Indian agriculture.

3 - Soil and climatic parameters with special emphasis on rainfall characteristics; constraints limiting crop production in dry land areas; types of drought, crop planning for erratic and aberrant weather conditions.

4 - Stress physiology and resistance to drought, adaptation of crop plants to drought, drought management

strategies; preparation of appropriate crop plans for dry land

areas; mid contingent plan for aberrant weather conditions. Techniques and practices of soil moisture conservation, mulches, antitranspirants; soil and crop management techniques, seeding and efficient fertilizer use.

5 - Concept of watershed resource management, problems, approach and components.

Unit VIII

Statistical Methods and Experimental Design

1 - Descriptive statistics, Exploratory data analysis, Theory of probability, Random variable and mathematical expectation. Discrete and continuous probability distributions, Binomial, Poisson, Negative Binomial, Normal distribution, Concept of sampling distribution: chi-square, t and F distributions. Tests of significance based on Normal, chi-square, t and F distributions.

2 - Introduction to theory of estimation and confidence-intervals, Simple and multiple correlation coefficient,

partial correlation, rank correlation, Simple and multiple linear regression model, test of significance of correlation coefficient and regression coefficients, Coefficient of determination, Fitting of quadratic models.

3 - Introduction to ANOVA: One way and Two Way, Introduction to Sampling Techniques, Introduction to

Multivariate Analysis, Transformation of Data.

4 - Need for designing experiments, characteristics of a good design. Basic principles of designs randomization, replication and local control. Uniformity trials, size and shape of plots and blocks, Analysis of variance,

5 - Completely randomized design, randomized block design and Latin square design. Factorial experiments Concept of confounding. Split plot and strip plot designs.

UNIT WISE ITEM COMPOSITION (TOTAL: 50 Items)

Unit-I

:07

Unit-II

:07

Unit-III

:05

Unit-IV

:07

Unit-V

:07

Unit-VI

:05

Unit-VII

:05

Unit-VIII

:07