ISTITUTE OF AGRICULTURE AND NATURAL SCIENCES
Deen Dayal Upadhyaya Gorakhpur University
Gorakhpur-273009

M.Sc (Ag) AGRICULTURAL EXTENSION

COURSE CURRICULUM AND SYLLABUS FOR ACADEMIC YEAR 2022-2023 According to Restructured and Revised 5ᵗʰ Dean Committee

Nomenclature and Credit hour

Nomenclature	Credit hours
COURSE WORK	
Major Courses	20
Minor Courses	08
Supporting course	06
Common Courses	05
Credit Seminar	01
Research work	30
Total	70

NOTE:

Major courses: From the Discipline in which a student takes admission.

Minor courses: From the subjects closely related to a student's major subject

a. It is suggested the student may choose at least two out of three courses listed below as part of minor courses as these are related to policy advocacy and aim to build larger understanding of the subject.
b. Further, it is suggested that the student may choose the remaining Courses from any other discipline including the disciplines of Agrl. Economics/ABM and are related to the research problem selected by the student.
c. The final choice of the minor courses should be mandatorily approved by the Student Advisory committee/HoD.

Supporting courses: The subject not related to the major subject. It could be any subject considered relevant for student's research work (such as Statistical Methods, Design of Experiments, etc.) or necessary for building his/ her overall competence.

Common Courses: The following courses (one credit each) will be offered to all students undergoing Master's degree programme:

1. Library and Information Services

2. Technical Writing and Communications Skills

3. Intellectual Property and its management in Agriculture

4. Basic Concepts in Laboratory Techniques

5. Agricultural Research, Research Ethics and Rural Development Programmes

Some of these courses are already in the form of e-courses/ MOOCs. The students may be allowed to register these courses/ similar courses on these aspects, if available online on SWAYAM or any other platform. If a student has already completed any of these courses during UG, he/ she may be permitted to register for other related courses with the prior approval of the Head of Department (HoD)/ Board of Studies (BoS).

Courses offered in each semester

SEMESTER I		
MAJOR COURSES		
COURSE CODE	**COURSE TITLE**	**CREDIT HOURS**
EXT 501	Extension Landscape	2 (2+0)
EXT 502	Applied Behaviour Change	3 (2+1)
TOTAL CREDIT OF MAJOR COURSES		**5**
MINOR COURSE		
EXT 508	Managing Extension Organizations	3(2+1)
SUPPORTING COURSE		
STAT 502	Statistical Methods for applied/social sciences	3(2+1)
COMMON COURSE		
PGS 501	Technical Writing and Communications Skills	1(0+1)
PGS 502	Library and Information Services	1(0+1)
TOTAL CREDIT		**14**

SEMESTER II		
MAJOR COURSES		
COURSE CODE	**COURSE TITLE**	**CREDIT HOURS**
EXT 504	Research Methodology in Extension	3(2+1)
EXT505	Capacity Development	3 (2+1)
TOTAL CREDIT OF MAJOR COURSES		**6**
MINOR COURSE		
EXT 509	Enabling Innovation	2(1+1)
SUPPORTING COURSE		

MCA 512	Computer Applications for Agricultural Extension Research	3(2+1)
COMMON COURSE		
PGS 503	Intellectual Property and its management in Agriculture	1(1+0)
PGS 504	Basic Concepts in Laboratory Techniques	1(1+0)
TOTAL CREDIT		**13**

SEMESTER III		
MAJOR COURSES		
COURSE CODE	**COURSE TITLE**	**CREDIT HOURS**
EXT 503	Organizational Behaviour and Development	3 (1+2)
EXT 506	ICTs for Agricultural Extension and Advisory Services	3(2+1)
EXT507	Evaluation and Impact Assessment	3(2+1)
TOTAL CREDIT OF MAJOR COURSES		**6**
MINOR COURSE		
EXT 510	Gender Mainstreaming	3(2+1)
COMMON COURSE		
PGS 505	Agricultural Research, Research Ethics and Rural Development Programmes	1(1+0)
TOTAL CREDIT		**13**

SEMESTER IV		
COURSE CODE	**COURSE TITLE**	**CREDIT HOURS**
EXT 591	Master's Seminar	1(1+0)
EXT599	Master's Research or Research methodology	30
TOTAL CREDIT		31

Syllabus

Course content of Major courses:

I. Course Title : Extension Landscape
II. Course Code : EXT 501
III. Credit Hours : 2+0
IV. Why this course?
Extension and advisory services (EAS) need to support farmers to deal with several new challenges they face currently. To effectively support farmers, EAS should perform several new functions and it should have capacities to perform these functions. EAS have evolved considerably especially during the last 3 decades. Several new approaches have emerged and many new funding and delivery models emerged in response to reforms (economic policies and new governance structure) implemented in several countries. Apart from these, new insights from communication and innovation studies have also started to influence the practice of extension. There is a lot of interest

globally in strengthening pluralistic EAS and enhancing its contribution towards development of an effective Agricultural Innovation System (AIS). Keeping these in view, there is a need to orient students of extension on how extension is shaped globally and the policy level challenges it faces so that the extension students fit well to the global demand for competent extension professionals who can appreciate and understand this changing context.

V. Aim of the course

The aim of this course is to introduce the new challenges before extension and how extension is evolving globally. It presents the new capacities that are needed by EAS providers to provide a much wider support to farmers and it orient students to the new insights from communication and innovation studies that are influencing the practice of extension globally. The course also help students to appreciate the process and the impact of extension reforms implemented in many countries, the new approaches that are evolving globally in different regions and the policy challenges in managing a pluralistic extension system. The course is organized as follows:

No	Blocks	Units
1	1 Globally, What is new in Extension?	1. Challenges Before Extension and Advisory Services
		2. New Functions and New Capacities
		3. Pluralism in EAS
2.	Insights from Communication &Innovation Studies & New Extension Approaches	1. From the Linear Paradigm To Systems Paradigm
		2. Evolving Extension Approaches
3	Extension Reforms And Policy Challenges	1.Changes In Governance, Funding and Delivery of EAS
		2.Challenges In Managing Pluralistic EAS

VI. Learning outcome

After successful completion of this course, the students are expected to be able to:

– Appreciate the changing global extension landscape

– Broaden their understanding on the role of EAS in agricultural innovation system

– Critically evaluate the reforms in extension and the evolving approaches in extension

– Analyse the policy level challenges in extension funding and delivery

Block 1: Globally, What Is New In Extension?

Unit 1: Challenges before Extension and Advisory Services (EAS)

Extension and Advisory Services (EAS)- Meaning (embracing pluralism and new functions) New Challenges before farmers and extension professionals: Natural Resource Management-Supporting farmers to manage the declining/deteriorating water and soil for farming; Gender Mainstreaming-How extension can enhance access to new knowledge among women farmers; Nutrition- Role of extension in supporting communities with growing nutritious crop and eating healthy food; Linking farmers to markets- Value chain extension including organizing farmers, strengthen value chain and supporting farmers to respond to new standards and regulations in agri-food systems; Adaptation to climate changes-How extension can contribute to up-scaling Climate Smart Agriculture; Supporting family farms strengthening the capacities of family farms; Migration-Advising farmers to better respond to opportunities that emerge from increasing mobility and also supporting migrants in enhancing their knowledge and skills; Attracting and Retaining Youth in Agriculture including promotion of agripreneurship and agri-tourism; Urban and peri-urban farming- How to support and address issues associated with urban

and peri-urban agriculture; Farmer distress, suicides- Supporting farmers in tackling farm distress.

Unit 2: New Functions and New Capacities

Beyond transfer of technology: Performing new functions to deal with new challenges; Organising producers into groups-dealing with problems that need collective decision making such as Natural Resource Management (NRM) and access to markets; Mediating conflicts and building consensus to strengthen collective decision making; Facilitating access to credit, inputs and services-including development of service providers; Influencing policies to promote new knowledge at a scale Networking and partnership development including convening multi-stakeholder platforms/

innovation platforms. New Capacities needed by extension and advisory services at different levels –at the individual (lower, middle management and senior management levels), organizational and enabling environment levels; –Core competencies at the individual level; Varied mechanisms for capacity development (beyond training).

Unit 3: Pluralism in EAS

Pluralism in Extension Delivery: Role of private sector (input firms, agri-business companies, consultant firms and individual consultants)- Trends in the development of private extension and advisory services in India and other countries; challenges faced by private extension providers; Role of Non-Governmental Organizations (National/international)/ Civil Society Organizations (CSOs) in providing extension. Experiences from India and other countries; Producer Organizations- Role in strengthening demand and supply of extension services; their strength and weaknesses-experiences from different sectors; Role of Media and ICT advisory

service providers; global experiences with use of media and ICTs in advisory services

provision.

Block 2: Insights From Innovation Studies and New Extension Approaches

Unit 1: From the Linear Paradigm to Systems Paradigm

Diffusion of Innovations paradigm- strengths and limitations; multiple sources of innovation-farmer innovation, institutional innovation; farmer participation in technology generation and promotion; strength and limitations; Agricultural Knowledge and Information Systems (AKIS); strength and limitations; Agricultural Innovation Systems (AIS); Redefining Innovation- Role of Extension and Advisory Services in AIS-From information delivery to intermediation across multiple nodes; Role of brokering; Innovation Platforms, Innovation Management; Strength and weaknesses of AIS. Rethinking Communication in the Innovation Process – Network building, support social learning, dealing with dynamics of power and conflict.

Unit 2: Evolving Extension Approaches

Evolution and features of extension approaches: Transfer of technology approach; educational approach, farmer participatory extension approach, demand-driven extension, market led extension (value chain extension), extension for climate smart agriculture, gender sensitive extension, extension for entrepreneurship Extension systems in different regions: Asia-Pacific, Europe, Latin America, Australia, North America Networking for Strengthening EAS: GFRAS (Global Forum for Rural Advisory Services) and its regional networks.

Block 3: Extension Reforms and Policy Challenges

Unit 1: Changes in Governance, Funding and Delivery

Reduction in public funding: public withdrawal from extension provision (partial/ full); Examples/Cases; Privatization: Public funding and private delivery; cost sharing and cost recovery; Examples/Cases; Decentralisation of extension services; Examples/ Cases; Lessons from extension reforms in different countries; Extension and Sustainable Development Goals (SDGs).

Unit 2: Challenges in Managing Pluralistic Extension Systems

Pluralism: Managing pluralism and Co-ordination of pluralistic extension provision; Public private partnerships in extension (including the role of local governments/ panchayats and producer organisations); Examples, challenges in co-ordination; Achieving convergence in extension planning and delivery, Financing Extension: Mobilising resources for extension: public investments, donor support (grants/loans); Monitoring and Evaluation of Extension: Generating appropriate data for Assessment and Evaluation of pluralistic extension; Strengthening extension policy interface; generating evidence on impact of extension and policy relevant communication.

VII. Teaching methods/activities

– Lecture

– Assignment (Reading/Writing)

– Book Review by students

– Student presentation

– Group Work

    I. Course Title   **: Applied Behaviour Change**

    II. Course Code   **: EXT 502**

    III. Credit Hours : 2+1

    IV. Why this course?

The behavioural change of the stakeholders is the key objective in extension profession, which is reflected through their enhanced capacity, attitude change, modification of perceptions and beliefs, improved understanding of a system, adoption of improved technologies, empowerment, and resilience to adverse phenomenon and improved decision-making. Irrespective of their role and profession, all the key stakeholders in agriculture like farmers, extension agents, scientists/ academicians, development managers and policy makers are human beings, whose behaviour is the product of internal psychological processes influenced by external environment. Since human

behaviour is a psychological phenomenon, expressed through interaction of internal psychological processes, social systems and external environment, there is an essential need to understand how these psychological processes guide the behavioural change. These psychological processes may be expressed at individual, group, community and organisational level involving human learning, choices, judgement and decisions about an extension intervention.

V. Aim of the course

This course aims to build capacities of students to understand the fundamental psychological processes which guide human behaviour at individual, group and community levels in specific contexts, to develop sound extension strategies.

The course is organized as follows:

No	Blocks	Units
1.	Foundations of Behaviour Change	1. Foundations of Human Behaviour
2.	Cognitive Processes and Learning	1. Cognitive Processes affecting Human Behaviour
		2. Information Processing
		3. Learning
		4. Judgement, Choice and Decision-making
3.	Human Behaviour in the Society	1. Attitudes and Influence
		2. Social Judgement, Social Identity and Inter-Group Relations

VI. Theory

Block 1: Foundations of Behaviour Change Unit 1: Foundations of Human Behaviour

Human behaviour – Meaning, importance and factors influencing human behaviour; Biological bases of human behaviour – Nervous system, brain, endocrine system and genes; Individual variations – intelligence, ability and creativity– foundations and theories, personality and temperament - foundations, approaches, theories of personality, measuring personality (traits, locus of control, self-

efficacy; Personal, social and moral development – meaning, concepts – self-concept, self-esteem and self-worth and theories. Motivation – foundations, approaches, theories, managing human needs and motivations; perceiving others – impression, attitude, opinions; Emotions - foundations, types and functions, measuring emotional intelligence.

Block 2: Cognitive Processes and Learning

Unit 1: Cognitive Processes affecting Human Behaviour

Sensory organs and their role cognition; Cognitive processes – Attention, perception, remembering and forgetting, knowledge and expertise – foundations and theories; Principles and processes of perception; Consciousness – meaning, types, sleep and dreams; Learning and Memory – Memory - meaning, types and mechanisms of storage and retrieval of memories in the Human brain; Complex cognitive processes

- Concept formation, Thinking, Problem-solving and transfer – foundations, theories and approaches.

Unit 2: Information Processing

Information processing – meaning, principles; Models of information processing - Waugh and Norman model of primary and secondary memory; Atkinson and Shiffrin's stage model of memory; other models including blooms taxonomy and Sternberg's Information Processing Approach; Attention and perception – meaning, types, theories and models; Consciousness.

Unit 3: Learning

Learning – foundations, approaches and theories; Cognitive approaches of learning
– meaning, principles theories and models; Memory – foundations, types; Behavioural approaches of learning – foundations and theories - classical conditioning, operant conditioning, applied behaviour analysis; Social cognitive and constructivist approaches to learning – foundations and theories – social cognitive theory, Self- regulated learning; learning styles – meaning, types and applications in learning.

Unit 4: Judgement, Choice and Decision-making

Human judgement – meaning, nature, randomness of situations, theories and models; Choice – meaning, criteria for evaluating options; theories and models of human choice; Choice architecture; Decision-making – Meaning, problem analysis; steps and techniques of decision-making under different contexts.

Block 3: Human Behaviour in the Society

Unit 1: Attitudes and Influence

Attitudes - meaning, assumptions, types, theories and models of attitude formation; methods of changing attitudes, Relating to others - liking, attraction, helping behaviour, prejudice, discrimination and aggression; Liking/ affect – meaning, types and theories; Attraction – meaning, types and theories; Persuasion – meaning, theories and techniques; Social influence and groups – conformity, compliance and obedience.

Unit 2: Social Judgment, Social Identity and Inter-Group Relations Social judgment – meaning, frame of reference, stereotyping; The judgment of attitude models; Attribution – meaning, theories; Rational decision making; Social identify – meaning, types; assessment; Groups – meaning, types, group processes; sustainability of groups; Inter group processes and theories social learning.

VII. Practicals

- Understanding perception – Attentional Blink and Repetition Blindness exercise
- Understanding attention - Testing selective attention capacity and skills and processing speed ability through Stroop test
- Hands-on experience in the techniques for assessing creative thinking – divergent and convergent thinking
- Lab exercise in applying Maslow's need hierarchy to assess motivation
- Learning - Classical conditioning and operant conditioning
- Assessing learning styles through Barsch and Kolb inventories
- Practical experience in building self-esteem
- Assessment of emotional intelligence
- Exercises in problem-solving
- Exercises in visual perception
- Measuring self-concept using psychometric tools
- Experiment on factors influencing information processing
- Assessment of attitudes
- Hands on experience in methods of persuasion
- Field experience in assessing social judgement
- Simulation exercise to understand decision-making under different situations

- Exercise in rational decision-making.

Teaching methods/activities

- Lecture cum discussion
- Class exercises
- Group Presentation

Learning outcome

The students should:

- Understand the biological and cognitive processes determining human behaviour
- Understand the process of learning under different context
- Develop competencies in influencing the human decision process in various contexts
- Design effective strategies to influence attitude and behaviour

I. **Course Title : Organisational Behavior and Development**
II. **Course Code : EXT 503**
III. **Credit Hours : 2+1**
IV. **Why this course?**

In changing and competitive world, the survival of any organization is dependent on its ability to adjust to the new challenges, adapt its structure and develop the competencies needed among its staff. This course is designed to understand the theory and practice relating to the processes of organizational behavior, development and change. It attempts to bring about change in the different levels of the organization (the individual, group and organization) using a wide variety of interventions.

V. **Aim of the course**

- To understand the theory and practice relating to the processes of organizational behavior, development and change.
- To develop insight and competence in diagnostic and intervention processes and skills for initiating and facilitating change in organizations.
- To gain necessary self-insight, skills in facilitation, organizational development (OD) skills, group process and techniques, to become an effective change agents and OD consultants.
- To understand the behavior of individuals and small groups in organization with special focus on beliefs, attitudes and values, human inference - attribution, self- concept, motivation,

active listening, interpersonal communication, conflicts management.

The course is organized as follows:

No	Blocks	Units
1.	Organisational Behaviour	1. Basics of Organisation
		2. Basics of Organisational Behaviour
		3. Individual Behaviour in Organizations
		4. Group Behaviour in Organizations
		5. Productive Behaviour and Occupational Stress
		6. Organisational Systems
2.	Organisational Development	1. Overview of Organisational Development
		2. Managing the Organisational Development Process
		3. Organisational Development Interventions
		4. Organisational Development Practitioner or Consultant

VI. Theory

Block 1: Organizational Behavior

Unit 1: Basics of Organization

Introduction to organizations-concept and characteristics of organizations; Typology of organizations; Theories of organizations: nature of organizational theory, Classical theories, Modern management theories, System Theory - Criticisms and lessons learnt/ analysis.

Unit 2: Basics of Organizational BehaviourConcepts of Organisational Behaviour, Scope, Importance, Models of OB.

Unit 3: Individual Behaviour in Organizations

Introduction, Self-awareness, Perception and Attribution, Learning, Systems approach to studying organization needs and motives – attitude, values and ethical behavior, Personality, **Motivation**-Concept & Theories, Managing motivation in organizations.

Unit 4: Group Behaviour in Organization

Foundations of group, group behaviour and group dynamics, Group Development and Cohesiveness, Group Performance and Decision Making, Intergroup Relations; Teams in Organizations-Team building experiential exercises, Interpersonal Communication and Group; Leadership: Meaning, types, Theories and Perspectives on Effective Leadership, Power and Influence, managing Conflict and Negotiation skills, Job/ stress management, decision-making, problem-solving techniques.

Unit 5: Productive Behaviour and Occupational Stress

Productive behaviour - Meaning, dimension; Job analysis and Job performance – meaning, dimensions, determinants and measurement; Job satisfaction and organizational commitment - meaning, dimensions and measures roles and role clarity; Occupational stress – meaning, sources, theories and models, effects, coping mechanism, effects and management; Occupational stress in farming, farmer groups/ organizations, research and extension organizations.

Unit 6: Organizational System

Organizations Structure- Need and Types, Line & staff, functional, committee, project structure organizations, centralization &decentralization, Different stages of growth and designing the organizational structure; Organizational Design- Parameters of Organizational Design, Organization and Environment, Organizational Strategy, Organization and Technology, Power and Conflicts in Organizations, Organizational Decision-Making; Organizational Culture vs Climate; Organizational Change; Organizational Learning and Transformation.

Block 2: Organisational Development

Unit 1: Overview of Organizational Development

Concept of OD, Importance and Characteristics, Objectives of OD, History and Evolution of OD, Implications of OD Values.

Unit 2: Managing the Organizational Development Process

Basic Component of OD Program-Diagnosis-contracting and diagnosing the problem, Diagnostic models, open systems, individual level group level and organizational level diagnosis; Action-collection and analysis for diagnostic information, feeding back the diagnosed information and interventions; Program Management- entering OD relationship, contracting, diagnosis, feedback, planned change, intervention, evaluation.

Unit 3: Organizational Development Interventions

Meaning, Importance, Characteristics of Organization development Interventions, Classification of

OD Interventions-Interpersonal interventions, Team Interventions, Structural Interventions, Comprehensive Interventions.

Unit 4: Organizational Development Practitioner or Consultant

Who is OD consultant? Types of OD consultants and their advantages, qualifications, Comparison of traditional consultants Vs. OD consultants, Organizational Development process by the practitioners skills and activities.

VII. Practicals

- Case Analysis of organization in terms of process – attitudes and values, motivation, leadership.
- Simulation exercises on problem-solving – study of organizational climate in different organizations.
- Study of organizational structure of development departments, study of departmentalization, span of control, delegation of authority, decision-making patterns.
- Study of individual and group behaviour at work in an organization.
- Conflicts and their management in an organization.
- Comparative study of functional and nonfunctional organizations and drawing factors for organizational effectiveness.
- Exercise on OD interventions (Interpersonal, Team, Structural, Comprehensive) with its procedure to conduct in an organization

VIII. Teaching methods/activities

- Lecture cum discussion
- Cases
- Class exercises
- Group Presentation

IX. Learning outcome

This course will equip the students to become potential change agents and OD practitioners. They should be able to learn how to improve individual, group/team and organizational performance through the use of OD techniques or interventions.

I. **Course Title: Research Methodology in Extension**

II. **Course Code : EXT 504**

III. **Credit Hours : 2+1**

IV. **Why this course?**

Growth of any discipline is directly proportional to the creation of knowledge in that discipline. Extension research is the backbone of extension discipline. Extension research is a unique social science inquiry where research ideas are gathered from the field problems and put through a systematic cycle of objective investigations that result in significant solutions. Apart from developing theories and models that advance scientific knowledge, extension research should also provide new insights for improving extension policy and practice. As extension is a field oriented discipline seeking to improve the welfare of its stakeholders, the extension professionals require critical competencies in conducting empirical research for developing sound extension models, methods and tools.

V. **Aim of the course**

This course aimed to create a workforce which has sound fundamental knowledge and critical competencies in planning, conducting and applying behavioural research for developing quality extension models, methods and tools.

The course is organized as follows:

No.	Blocks	Units
1.	Introduction to behavioural research	1. Nature of Behavioural Research
		2. The Behavioural Research Process
2.	Steps in behavioural research	1. Formulating a Research Problem process
		2. Reviewing the Literature
		3. Identifying Variables and Hypotheses
		4. Formulating Research Designs, Methods & Tools
		5. Selecting Sample
		6. Collecting Data

7.Analysing and Interpreting the Data

8.Reporting and Evaluating Research

3. Theory

Block 1: Introduction To Behavioural Research

Unit 1: Nature of Behavioural Research

Methods of knowing; Science and scientific method; Behavioural research – Concept, aim, goals and objectives; Characteristics and Paradigms of research; Types of behavioural research based on applications, objectives and inquiry; Types of knowledge generated through research – historical, axiological, theoretical and conceptual knowledge, prior research studies, reviews and academic debate; Role of behavioural research in extension; Careers in behavioural research.

Unit 2: The Behavioural Research Process

Basic steps in behavioural research – Formulating a Research Problem; Reviewing the Literature; Identifying the variables and hypotheses; Formulating research designs, methods and tools; Selecting sample; Collecting data; Analyzing and Interpreting the Data; Reporting and Evaluating Research; Skills needed to design and conduct research; Writing research proposals.

Block 2: Steps in Behavioural Research Process

Unit 1: Formulating a Research Problem

The research problem and research topic - definitions; Importance of formulating a research problem; Sources of research problems; Characteristics of a good research problem; Research problems in quantitative and qualitative research; Steps in formulating a research problem; Strategies for writing research problem statement; Research purpose statement; Research questions – Types, Criteria for selecting research questions, techniques for narrowing a problem into a research question; Objectives - Meaning, types and criteria for judging the objectives.

Unit 2: Reviewing the Literature

Review-meaning and importance; Types of literature review – Context, Historical, Integrative, methodological, self-study and theoretical; Literature review for quantitative and qualitative studies; Steps in conducting literature review – Identify key terms, locate literature, critical evaluation and selection; organising literature and writing literature review.

Unit 3: Identifying Variables and Hypotheses

Developing theoretical, conceptual, empirical frameworks; Approaches for identifying concepts, constructs and variables; Role of theory in behavioural research; Steps in identifying variables – Domain, Concepts, Constructs, Dimensions; Indicators; Variables, Definitions, premises, propositions and hypotheses; Techniques of identifying concepts, constructs and variables - Types of concepts; Types of variables

- causal relationship, the study design; and the unit of measurement; Types of definitions-Types of propositions and hypotheses. Characteristics of good hypotheses; Measurement – Meaning, levels of measurement – nominal, ordinal, interval and ratio; Criteria for choosing measurement levels for variables.

Unit 4: Formulating Research Designs, Methods and Tools

Research designs – Definition, purpose and functions; Research Design as Variance Control - MAXMINCON Principle; Criteria for selecting a suitable Research Design; Classification of research designs: Quantitative designs - experimental, descriptive, comparative, correlational, survey, ex-post facto and secondary data analysis; Qualitative designs - ethnographic, grounded theory, phenomenological and Narrative research; Mixed method designs – Action research design; Translational research; Elements of research design - Research strategies, Extent of researcher interference, Study setting, Unit of analysis and Time horizon. Sources of errors while specifying research designs. Internal and external validity; Choosing right research design; Triangulation - Importance in behavioural research, Types of triangulation. Research methods: Designing research Instruments – questionnaires, interview schedules; tests – knowledge tests, behaviour performance tests; scales

- scales and indexes, checklists, focus groups; Steps in developing and using research methods and tools; participatory rural appraisal.

Unit 5: Selecting Sample

Sampling - population, element, sample, sampling unit, and subject; Sampling strategies for quantitative and qualitative research; Principles of sampling; Factors affecting the inferences drawn from a sample; Types of sampling, Methods of drawing a random sample, Sampling with or without replacement, Types of sampling

- Probability Sampling - Simple random sampling, Cluster sampling, Systematic sampling, Stratified random sampling and Unequal probability Sampling; Non- probability Sampling - Reliance of available subjects, Purposive or judgmental sampling, accidental sampling, expert sampling, Snowball sampling, and Quota sampling; Sample size requirements for quantitative and qualitative studies. Methods for estimating sample size; Generalisation – Importance, Types of generalisations.

Unit 6: Collecting Data

The process of collecting data – Selection, training, supervision, and evaluation of field investigators; Online data collection; Errors and biases during data collection. Testing goodness of measures through item analysis - Reliability and validity; Types of validity – Content validity: Face and content validity, Criterion-related validity: concurrent and predictive validity, Construct validity: convergent, and discriminant validity, factorial validity, and nomological validity; Types of reliability

Test-Retest, Parallel forms, Inter-item consistency reliability, Split-half reliability.

Factors affecting the validity and reliability of research instruments, Strategies for enhancing validity and reliability of measures. Validity and reliability in qualitative research.

Unit 7: Analyzing and Interpreting the Data

Data coding, exploration and editing; Methods of data processing in quantitative and qualitative studies; Quantitative data analysis - parametric and non-parametric statistical analyses; Parametric analysis – Descriptive and inferential statistics, Hypothesis testing - Type I and Type II errors. Concepts in hypothesis testing - Effect Size, á, â, and Power, P Value; Multivariate data analysis – regression, factor analysis, cluster analysis, logistic regression and structural equation modelling. Guidelines for choosing appropriate statistical analysis; Statistical packages for data analysis; Methods of interpreting data and drawing inferences - The Ladder of Inference; Methods of communicating and displaying analysed data.

Unit 8: Reporting and Evaluating Research

Writing reports and research publications; Evaluation Methodology

4. **Practicals**
- Selecting a research problem and writing problem statement
- Narrowing down research problem to purpose, research questions and objectives
- Choosing, evaluating and reviewing research literature

- Selection of variables through construct conceptualisation and defining variables
- Choosing research design based on research problem
- Choosing right sampling method and estimating sample size
- Developing research methods and tools – questionnaires, interview schedule, check lists and focus group guides
- Writing a research proposal
- Field data collection using research methods and tools
- Testing reliability and validity of research instruments
- Hands on experience in using SPSS for coding, data exploration, editing, analysis and interpretation Formulation of secondary tables based on objectives of research
- Writing report, writing of thesis and research articles
- Presentation of reports

5. **Teaching methods/activities**
   - Lecture cum discussion
   - Class exercises
   - Assignment(Reading/Writing)
   - Student's Book/Publication Review
   - Student presentation
   - Group Work
   - Research Report

6. **Learning outcome**
   - Understand the concepts, paradigms, approaches and strategies of behavioural research
   - Enable to choose research design, methods and tools suitable for the research problem
   - Design research instruments skilfully and conduct research in an objective and unbiased way
   - Analyse the data through appropriate analytical methods and tools and derive meaningful interpretations

I. **Course Title : Capacity Development**

II. **Course Code : EXT 505**

III. **Credit Hours : 2+1**

IV. **Why this course?**

Competent and skilful extension professionals are not naturally born. Their capacities need to be improved primarily at three different levels:

1. Pre-service capacity development – Under graduation and post-graduation studies
2. Induction capacity development – Just before job entry
3. In-service capacity development – During job

If undergone appropriately, pre-service studies help extension professionals to mainly acquire knowledge related to development. However, they are not fully ready for development work with required attitude and skills needed by an organisation. Properly planned and organized induction / in-service capacity building programmes help them to use development concepts, apply methods, exhibit attitude and skills required for development work at different levels. In short, the essence of this course is to make you understand these notions and help you to think up, manage, put into practice and evaluate capacity development programmes.

V. Aim of the course

- To understand the concepts of training, capacity building, capacity development and human resource development in the context of roles and responsibilities of extension professionals
- To discuss capacity development- approaches, strategies, needs assessment and methods / tolls
- To help you devise, organize, implement and evaluate capacity development programmes

The course is organized as follows:

No	Blocks	Units
1.	Introduction to Capacity Development	1. Capacity Development - An Overview 2. Capacity Development - Approaches and Strategies 3. Planning and Organization of Capacity Development Programmes
2.	Capacity Development Needs Assessment	1. Capacity Development Needs Assessment - An Overview 2. Capacity Development Needs Assessment Methods

3. Capacity Development Institutions 1. Capacity Development Institutions and Management   2. Capacity Development Project Formulation

4. Capacity Development Process 1. Capacity Development Methods and Tools and HRD   2. Evaluation

3. Impact Assessment

4. Human Resource Development

VI. Theory

Block 1: Introduction to Capacity Development

Unit 1: Capacity Development–An Overview

Training, capacity building, capacity development and HRD-Meaning and differences; Need and principles of capacity development; Types and levels of capacities - Institutional capacities (include the rules, regulations and practices that set the overarching contextual environment), Organisational capacities (how various actors come together to perform given tasks), Individual capacities (technical, functional and leadership skills). Types of capacity building - Based on structure (structured, semi-structured &unstructured), Based on context (orientation, induction and refresher), and other categories (online, Webinar, distance etc.). Components of capacity development; Capacity development cycle.

Unit 2: Capacity Development- Approaches and Strategies

Capacity Development Dilemma- Theory versus Practice, Trainee versus Task, Structured versus Unstructured, Generic and Specific; Approaches in Capacity Development -Informative approach, Participatory approach, Experimental approach/ Experiential, Performance based approach; Capacity Development Strategies - Academic strategy, Laboratory strategy, Activity strategy, Action strategy, Personal development strategy, Organizational development strategy.

Unit 3: Planning and Organization of Capacity Development Programmes

Steps in Designing and Planning of Capacity Development- Step 1. Select the participants, Step 2. Determine the participants' needs, Step 3. Formulate goal and objectives, Step 4. Outline the content, Step 5. Develop instructional activities, Step 6. Prepare the design, Step 7. Prepare evaluation form, Step 8. Determine follow-up activities; Organising capacity development programme; Operational arrangements at different stages- Before the programme, During the programme, Middle of the programme, At the end of the programme, After the programme, Follow up; Stakeholders'

responsibilities.

Block 2: Capacity Development Needs Assessment

Unit 1: Planning and Organization of Capacity Development Programmes Concept of Need Assessment; Approaches in Need Analysis- Performance Analysis, Task Analysis, Competency Study; Needs Survey.

Unit 2: Capacity Development Needs Assessment Methods

Data Collection Methods in Identifying Needs - Rational Methods (Observation, Informal talks, Complaints, Comparison, Analysis of report, Opinion poll, Buzz session, Analysis of the new programme), Empirical Methods (Job analysis, Performance evaluation, Checklist or Questionnaire Method, Tests, Critical Incident Technique, Card Sort Method, Focus Group Discussion, Interview, SWOT Analysis); Information and Skills required in Need Analysis; Identification of Needs through Task Analysis - Task identification, Task Analysis, Gap Analysis.

Block 3: Capacity Development Institutions and Management

Unit 1: Capacity Development Institutions

Capacity Developer (Trainer): Meaning and concept; Types of Capacity Developers (regular, *ad-hoc*, part time, guest and consultants); Roles of Capacity Developer (explainer, clarifier, supporter, confronter, role model, linker, motivator, translator/ interpreter, change agent); Good Capacity Developer – Qualities, skills and roles Qualities, Skills (Intrapersonal & Inter personal), Roles (Manager, Strategist, Task Analyst, Media Specialist, Instructional Writer, Marketer, Facilitator, Instructor, Counsellor, Transfer Agent, Evaluator); Capacity Development Centres and Locations; Organisation's Role in Capacity Development.

Unit 2: Capacity Development Project Formulation

Project Proposal: Concept and Meaning; Steps in Project Formulation- Review of past proposals, Consulting experts, consultants, and previous organizers, Review past project evaluation reports, Interact with the prospective beneficiaries; Format for Writing Project Proposal (LFA).

Block 4: Capacity Development Process and HRD

Unit 1: Capacity Development Methods and Tools

Capacity Development Methods –Lecture, Discussion, Syndicate, Seminars, Conference, Symposium, Role Play, Case study, Programmed Instruction, T - group/ Laboratory methods; Factors

Determining Selection of Methods - Capacity development objectives, subject matter, categories of participants, and the available resources like time, location, budget; Capacity Development Aids.

Unit 2: Evaluation

Capacity Development Programme Evaluation - Meaning & Importance; Purpose of Evaluation; Principles of Evaluation; Types of Evaluation – Formative, Summative, Kirkpatrick's four levels of evaluation; Process of Evaluation- Evaluation at the beginning, Evaluation during the programme, Evaluation at the end; Use of evaluation findings; Statistical Tools for evaluation.

Unit 3: Impact Assessment

Impact Assessment- Meaning, Need, Features, Benefits, Concepts; Indicators for Impact Assessment - Direct indicators, Indirect or proxy indicators, Quantitative indicators, Qualitative indicators, Result chain / hierarchy of indicators; Methods of Impact Evaluation- Learning retention of participants (KOSA), Impact on the job performance, Impact on organizational effectiveness, Impact on stakeholder's competency.

Unit 4: Human Resource Development

HRD: Meaning, Importance and Benefits; Types of HRD Systems & Sub-systems Career system (Manpower planning, Recruitment, Career planning, Succession planning, Retention), Work system (Role analysis, Role efficacy, Performance plan, Performance feedback and guidance, Performance appraisal, Promotion, Job rotation, Reward), Development system (Induction, Training, Job enrichment, Self-learning mechanisms, Potential appraisal, Succession development, Counselling, Mentor system), Self-renewal system (Survey, Action research, Organisational development interventions), Culture system (Vision, mission and goals, Values, Communication, Get together and celebrations, Task force, Small groups); Components of HRD System - Performance Appraisal, Potential Appraisal, Task System, Development System, Socialisation System, Governance; Functions of HRD-Organisational Development, Career Development, Capacity Development.

VII. Practicals

- Capacity development needs assessment exercise
- Capacity development project formulation exercise
- Planning organizing and conducting an extension capacity development programme
- Designing a programme
- Writing learning objectives
- Developing objectives into curriculum

- Training plan
- Organizing capacity development workshop
- Evaluation with pre- and post-training tests
- Training methods – Practicing each method mentioned in contents as group exercise

VIII. Teaching methods/activities

- Lecture
- Assignment (Reading/Writing)
- Student's Book/Publication Review
- Student presentation
- Group work
- Case Analysis
- Guest Lectures
- Review of training manuals and training evaluation studies
- Short attachments to a nearby training institute.

IX. Learning Outcome

After successful completion of this course, the students are expected to be able to:

- Differentiate between training, capacity building, capacity development and human resource development
- Explain different levels of capacities, needs assessment approaches & methods, capacity development methods and tools
- Formulate, implement and evaluate need based capacity development programmes

I. Course Title: ICTs for Agricultural Extension and Advisory Services

II. Course Code : EXT 506

III. Credit Hours : 2+1

IV. Why this course?

Information and Communication Technologies (ICTs) are continuously evolving. More ICT applications having better relevance to extension and advisory services (EAS) are currently available considering the human and other resource constrains faced by EAS, ICTs can supplement and complement EAS extension efforts in a cost-effective way. Extension professionals should have sound knowledge of ICTs and comprehensive understanding on its various applications for effectively

deploying these in EAS provision. This course will provide knowledge and hands-on-experience on ICT applications relevant for EAS.

V. Aim of the course

- To discuss different ICT initiatives, knowledge management process and application aspects
- To orient students on advances in smart/ disruptive technologies and data analytics
- Hands on experience in navigating ICTs

The course is organized as follows:

No	Blocks	Units
1.	Introduction to Information and Technologies (ICTS) and e-Extension	1. ICTs- Concepts and Status Communication 2. ICTs in Knowledge Management 3.e-Extension initiatives in Agriculture & allied sectors
2.	Application of ICTs in Extension and advisory services	1. ICT Applications 2.ICT Expert Systems 3.ICT Networks
3.	Knowledge management and Standards	1. Policies in Knowledge Management 2. Web Standards 3.Social Media Applications to engage audience
4.	Smart and disruptive Technologies and advanced analytics for agricultural extension	1. Smart Technologies 2. Human Computer Interactions

VI. Theory

Block 1: Introduction to Information and Communication Technologies (ICTs) and E-extension

Unit 1: ICTs- Concepts and Status

ICTs- meaning, concepts, basics of ICTs, global and national status, types and functions of ICTs, innovations, meaning of e-Governance, e-learning, mLearning, advantages and limitations of ICTs.

Unit 2: ICTs in Knowledge Management

Knowledge management-meaning, approaches and tools. Role of ICTs in Agricultural Knowledge Management.

Unit 3: e-Extension initiatives in Agriculture and allied sectors

e-Extension, overview on Global and national e-extension initiatives, Inventory of e-Extension initiatives in Agriculture and allied sectors from Central and State governments, ICAR, SAUs, private sector and NGO initiatives in India.

Block 2: Application of ICTs in Extension and Advisory Services

Unit 1: ICT Applications

Knowledge centres (tele centres), digital kiosks, websites and web portals, community radio, farmers call centres, mobile phone based advisory services and mobile applications (mExtension, mLearning), Self-learning CDs on Package of practices, social media, digital videos, Market Intelligence and Information Systems- ICT enabled Supply-Chains and Value-Chains/ e-Marketing (e-NAM, Agmarknet, *etc*.).

Unit 2: ICT Expert Systems

Expert System/ Decision Support System/ Management Information Systems, Farm Health Management & Intelligence System for Plant Health, Animal Health, Soil Health, Fishery, Water, Weather, etc.

Unit 3: ICT Networks

Global and regional knowledge networks, international information management systems, e-Learning platforms (MOOCS, Course CCRA, EduEx, *etc*), e-Governance Systems; digital networks among extension personnel, Farmer Producers Organisations (FPOs)/ SHGs/ Farmers Groups.

Block 3: Knowledge Management and Standards

Unit 1: Policies in Knowledge Management

Global policy/ Standards on e-Governance, National policy on e-governance, Open Data / Open Gov Standards and Open Source etc; Language Technology Applications; National e-Agriculture policy/ Strategies/ guidelines.

Unit 2: Web Standards

Web standards, creating and writing for webportals, development of mobile applications, developing digital videos- story board- video recording- video editing, types of blogs and writing guidelines.

Unit 3: Social Media Applications to engage audience

Video conference, live streaming and webinars, types and functions of social media applications, guidelines for preparing social media content, engaging audience and data-analytics.

Block 4: Smart and Disruptive Technologies and Advanced Analytics for Agricultural Extension

Unit 1: Smart Technologies

Open technology computing facilities, System for data analytics/ mining/ modelling/ Development of Agricultural simulations; Remote Sensing, GIS, GPS, Information Utility (AIU); disruptive technologies- Analysis; Internet of Things (IoTs), Drones, Artificial intelligence (AI), block chain technology, social media and Big Data analytics for extension.

Unit 2: Human Computer Interactions

Human Centered Learning/Ergonomics/ Human Computer Interactions-Meaning; Theories of multimedia learning - Sweller's cognitive load theory, Mayer's cognitive theory of multimedia learning, Schnotz's integrative model of text and picture comprehension, van Merriënboer's four-component instructional design model for multimedia learning; Basic Principles of Multimedia Learning - Split-attention, Modality, Redundancy, Coherence, Signaling, segmenting, pre-training, personalisation, voice embodiment; Advanced principles - Guided discovery, worked examples, Self-explanation, drawing, feedback, multiple representation, Learner control, animation, collaboration, prior knowledge, and working memory. Designing ICT gadgets based on human interaction principles - Interactive design-Meaning, importance; Approaches of interactive design - user-centered design, activity- centered design, systems design, and genius design; Methods of interactive design - Usability testing methods.

VII.   **Practicals**
*   Content and client engagement analysis
*   Designing extension content for ICTs
*   Creating and designing web portals, blogs, social media pages
*   Developing digital videos
*   Live streaming extension programmes and organising webinars

- Working with Farmers call centres
- Engaging with professional digital networks
- Writing for digital media

VIII. **Teaching methods/activities**

– Lecture

– Guest Lectures

– Assignment (Reading/Writing/ developing mApps/ media management/Social media initiatives)

– Student's Book/Publication Review

– Student presentation

– Group Work

– Student's interview of ICT practitioners/ champions

– Documenting good practices and case studies

– Review of ICT policy documents and guidelines/ standards

– Short internship with ICT projects

IX. **Learning outcome**

After successful completion of this course, the students are expected to be able to:

- Appreciate the importance of the ICTs in EAS

- Understand the ICT application aspects

- Critically evaluate ICT initiatives and smart/disruptive technologies

- To execute extension functions by applying ICTs and

- Engage stakeholders in knowledge management process

I. **Course Title** : **Evaluation and Impact Assessment**

II. **Course Code** : **EXT 507**

III. **Credit Hours : 2+1**

IV. **Why this course?**

Many organizations now look for experts to evaluate development projects and developmental interventions. It is now required that impact be assessed whenever any development programme is implemented. Thus, the extension professionals need to have good understanding of the theory and practice of programme evaluation and impact assessment. This course, thus, has been designed to help

students develop as extension professionals who can plan and conduct systematic assessments of the results and impacts of extension programmes.

V. Aim of the course

- To orient students on the importance of evaluation and impact assessment
- To develop capacities for evaluation and impact assessment
- Discuss ways of conducting evaluations and impact assessment

The course is organized as follows:

No	Blocks	Units
1.	Programme Evaluation	1. Introduction to Evaluation 2. Evaluation Theories
2.	Evaluation Process	1. How to Conduct Evaluation 2. Evaluating the Evaluation
3.	Programme Management Techniques	1. SWOT Analysis and Bar Charts 2. Networks
4.	Programme Evaluation Tools	1. Bennett's Hierarchy of Evaluation 2. Logic Framework Approach
5.	Impact Assessment	1. Introduction to Impact Assessment 3. Impact Assessment Indicators 4. Approaches to Impact Assessment 5. Environment Impact Assessment

VI. Theory

Block 1: Programme Evaluation

Unit 1: Introduction to Evaluation

Concept of Evaluation: Meaning and concept in different contexts; Why Evaluation is Done and When? Programme planning, analyse programme effectiveness, decision making, accountability, impact assessment, policy advocacy; Objectives, types, criteria and approaches of programme evaluation, evaluation principles; the context of program evaluation in agricultural extension; Role

and Credibility of Evaluator: Role as educator, facilitator, consultant, interpreter, mediator and change agent. Competency and credibility of evaluator.

Unit 2: Evaluation Theories

Evaluation theory vs. practice – synergistic role between practice and theory in evaluation; Evaluation theories - Three broad categories of theories that evaluators use in their works - programme theory, social science theory, and evaluation theory (other theories/ approaches - Utilization-Focused Evaluation & Utilization-Focused Evaluation (U-FE) Checklist, Values Engaged Evaluation, Empowerment Evaluation, Theory-Driven Evaluation). Integration between theory and practice of evaluation:

–evaluation forums, workshops, conferences and apprenticeship/ internship.

Block 2: Evaluation Process

Unit 1: How to Conduct Evaluation

Ten Steps in programme evaluation: (1) Identify and describe programme you want to evaluate (2) Identify the phase of the programme(design, start-up, on- going, wrap-up, follow-up) and type of evaluation study needed (needs assessment, baseline, formative, summative, follow-up) (3) Assess the feasibility of implementing an evaluation (4) Identify and consult key stakeholders (5) Identify approaches to data collection (quantitative, qualitative, mixed) (6) Select data collection techniques (survey interviews and questionnaires with different types) (7) Identify population and select sample (sampling for evaluation, sample size, errors, sampling techniques

(8) Collect, analyse and interpret data (qualitative and quantitative evaluation data analysis) (9) Communicate findings (reporting plan, evaluation report types, reporting results, reporting tips, reporting negative findings (10) Apply and use findings (programme continuation/ discontinuation, improve on-going programme, plan future programmes and inform programme stakeholders).

Unit 2: Evaluating the Evaluation

Evaluating the Evaluation - 10 Steps as above with focus on conceptual clarity, representation of programme components and stakeholders, sensitivity, representativeness of needs, sample and data, technical adequacy, methods used for data collection and analysis, costs, recommendations and reports.

Block 3: Programme Management Techniques

Unit 1: SWOT Analysis and Bar Charts

SWOT Analysis – Concept, origin and evolution; SWOT As a Programme Management Tool; Conducting SWOT Analysis - Common Questions in SWOT Analysis; Advantages and Disadvantages of SWOT; Bar Charts (Gantt Charts and Milestone Charts) - Characteristics, advantages and limitations.

Unit 2: Networks

Networks – Introduction, origin and widely used networks (Programme Evaluation and Review Technique (PERT) and Critical Path Method (CPM), differences between PERT and CPM, advantages and disadvantages. Networks Terminology – Activity, Dummy activity, Event (predecessor event, successor event, burst event, merge event, critical event), Earliest Start Time (EST), Latest Start Time (LST), Critical Path, Critical Activity, Optimistic time (T_o), Pessimistic time (P_o), Most likely time (T_M), Expected time (T_E), Float or Slack, Event Slack, Lead time, Lag time, Fast tracking, Crashing critical path, Acclivity Table, Danglers, Normal Time. Rules for Preparation of Networks and Steps in Network Preparation with example.

Block 4: Programme Evaluation Tools

Unit 1: Bennett's Hierarchy of Evaluation

Introduction to Bennett's hierarchy – Background and description; Relation between programme objectives & outcomes at 7 levels of Bennett's hierarchy – Inputs, activities, participation, reactions, KASA changes, practice and behaviour changes, end results. Advantages and Disadvantages of Bennett's hierarchy

Unit 2: Logic Framework Approach (LFA)

Introduction to LFA – Background and description; Variations of LFA - Goal Oriented Project Planning (GOPP) or Objectives Oriented Project Planning (OOPP); LFA Four-by-Four Grid – Rows from bottom to top (Activities, Outputs, Purpose and Goal & Columns representing types of information about the events (Narrative description, Objectively Verifiable Indicators (OVIs) of these events taking place, Means of Verification (MoV) where information will be available on the OVIs, and Assumptions). Advantages and Disadvantages of LFA.

Block 5: Impact Assessment

Unit 1: Introduction to Impact Assessment

Concept of Impact Assessment: Meaning, concept and purpose in different contexts; Impact Assessment Framework: Meaning of inputs, outputs, outcomes, impacts and their relation with

monitoring, evaluation and impact assessment.

Unit 2: Impact Assessment Indicators

Indicators for impact assessment – meaning and concept; Selecting impact indicators; Types of impact indicators for technology and extension advisory services - social and behavioral indicators, socio-cultural indicators, technology level indicators, environmental impact assessment indicators and institutional impact assessment indicators.

Unit 3: Approaches for Impact Assessment

Impact assessment approaches – Quantitative, qualitative, participatory and mixed methods with their advantages and disadvantages; Quantitative Impact Assessment Types – Based on Time of Assessment (Ex-ante and ex-post), Based on Research Design (Experimental, quasi experimental, Non-experimental). Econometric Impact Assessment: - (Partial Budgeting Technique, Net Present Value, Benefit Cost Ratio, Internal Rate of Return, Adoption Quotient, *etc*). Qualitative and Participatory Impact Assessment Methods.

Unit 4: Environment Impact Assessment (EIA)

Concept of EIA – Introduction, What it is? Who does it? Why it is conducted? How it is done?; Benefits and important aspects of EIA-risk assessment, environmental management and post product monitoring. Environmental Components of EIA – air, noise, water, biological, land; Composition of the expert committees and Steps in EIA process - screening, scoping, collection of baseline data, impact prediction, mitigation measures and EIA report, public hearing, decision making, monitoring and implementation of environmental management plan, assessment of alternatives, delineation of mitigation measures and EIA report; Salient Features of 2006 Amendment to EIA Notification - Environmental Clearance/Rejection, participants of EIA; Shortcomings of EIA and How to improve EIA process?

VII. Practicals

Search the literature using web / printed resources and identify evaluation indicators for the following:

- Utilization-Focused Evaluation
- Values Engaged Evaluation
- Empowerment Evaluation
- Theory-Driven Evaluation
- Visit Directorate of Extension in your university and enquire about extension programmes

being implemented / coordinated by Directorate. Develop an evaluation proposal of any one programme using 'Ten Steps in Programme Evaluation' discussed in the theory class.

- Review any comprehensive programme evaluation report from published sources. Evaluate the report and write your observations following the 'Evaluating the Evaluation' approach.

- Identify at least four agriculture development programmes and their objectives being implemented in your state. Write two attributes each on Strengths, Weaknesses, Opportunities and Threats related to the identified programme objectives in the SWOT grid.

- Identify an on-going development programme and make-out 6 activities from the programme.

- Draw a Gantt chart for 12 months programme activities.

- Write a report on evaluation hierarchy levels and indicators as per Bennett's hierarchy of evaluation for any development programme or project.

- Develop LFA four-by-four grid for any development programme or project with activities, outputs, purpose and goal and objectively verifiable indicators, means of verification & assumptions.

- Visit a nearby KVKs / ATIC. Select any agriculture technology with package of practices and extension advisory services promoted by KVK / ATIC. Identify impact assessment indicators for social and behavioral indicators, socio-cultural indicators, technology level indicators, environmental impact assessment indicators and institutional impact assessment indicators.

- Refer any Environment Impact Assessment report and analyse steps in EIA. Write your observations.

VIII. **Teaching methods/activities**

 – Lecture

 – Assignment (Reading/Writing)

 – Student's Book/Publication Review

 – Student presentation

 – Group Work

 – Guest Lectures

IX. **Learning outcome**

After successful completion of this course, the students are expected to be able to: Develop competencies in the areas of evaluation planning, indicator development, conducting evaluation and impact assessment and writing reports.

I. **Course Title** : **Managing Extension Organizations**

II. **Course Code** : **EXT 508**

III. **Credit Hours : 2+1**

IV. **Why this course?**

Organizations need to follow management principles, objectives and organizational processes. The extension organizations including management of agricultural extension services need to be managed for effectiveness and efficiency. This calls for key business management skills to be learnt by the students so that they can run extension organizations, and extension and advisory services efficiently using the principles, practices, knowledge and skills required for effective management.

V. **Aim of the course**

- To orient students on the importance of knowledge and skills on various management functions, as applicable to extension organizations
- Discuss ways of running extension services as managers of agri-ventures
- To develop capacities for becoming effective managers of agri-ventures

The course is organized as follows:

No	Blocks	Units
1.	Basics of Management	1. Management- An Over view
2.	Management in different types Extension organizations	1. Extension Management in public, private of sector and other sectors
		2. Concepts in Management
3	Motivation and Organizational	1.Motivation and Communication Communication
		2. Supervision and Control

Theory

Block 1: Basics of Management

Unit 1: Management- An Over view

Management and Extension management – Meaning, concept, nature and importance; and theories of management. Management, administration and supervision - meaning, definition and scope; Approaches to management, Principles, functions and levels of management; Qualities and skills of a manager; Interpersonal relations in the organization; Reporting and budgeting

Block 2: Management in different types of Extension Organizations

Unit 1: Extension Management in public, private sector and other sectors

Extension management (POSDCORB) in the public sector, Department of Agriculture, Agricultural Technology Management Agency (ATMA), Krishi Vigyan Kendra (KVK), SAUs, ICAR Institutes, Private sector, Cooperatives, NGOs, FPOs etc. Organisational Structure, Relations between different units- Challenges in management.

Unit 2: Concepts in Management

Decision making – Concept, Types of decisions, Styles and techniques of decision making, Steps in DM Process, Guidelines for making effective decisions; Human Resource Management: Manpower planning, Recruitment, Selection, Placement and Orientation, Training and Development; Dealing with fund and staff shortages in different extension organizations (KVK, ATMA etc.); Leadership – Concept, Characteristics, Functions, Approaches to leadership, Leadership styles; Authority and responsibility, Delegation and decentralization, line and staff relations; Challenges of co-ordination in extension organizations; Managing interdepartmental coordination and convergence between KVK, ATMA and line departments; Coordinating pluralism in extension services; Challenges in managing public-private partnerships (PPPs) at different levels in agricultural development in general and extension in particular; Performance appraisal – Meaning, Concept, Methods.

Block 3: Motivation and Organizational Communication

Unit 1: Motivation and Communication

Managing work motivation – Concept, Motivation and Performance, Approaches to motivation, team building; Organizational Communication – Concept, Process, Types, Networks, Barriers to

Communication; Mentoring, Time management, Team work and team-building strategies; Modernization of information handling

Unit 2: Supervision and Control

Supervision – Meaning, Responsibilities, Qualities and functions of supervision, Essentials of effective supervision; Managerial Control – Nature, Process, Types, Techniques of Control, Observation, PERT and CPM, Management Information Systems (MIS): Concept, tools and techniques, MIS in extension organizations.

VII. Practicals

- Simulated exercises on techniques of decision making
- Study the structure and function of agro-enterprises, Designing organizational structure/ organograms.
- Group activity on leadership development skills
- Simulated exercise to understand management processes
- Field visit to extension organizations (ATARI, KVKs, NGOs), FPOs, dairy cooperatives to understand the functions of management
- Practical exercises on PERT & CPM
- Group exercise on development of short term and long term plans for agro- enterprises
- Developing model agriculture-based projects including feasibility study, financial planning and cost-benefit analysis

VIII. Teaching methods/activities

- Lecture
- Assignment (Reading/Writing)
- Student's Book/Publication Review
- Student presentation
- Group Work
- Student's interview of officers engaged in EAS
- Short attachments

IX. Learning outcome

After successful completion of this course, the students are expected to be able to:

- Turn good managers of extension and advisory services including agri-ventures, FPOs,

cooperatives etc.

- – understand the key business skills needed for managing agribusinesses and managing the value chains
- – critically evaluate the Management functions to make extension systems efficient by applying management principles and good practices of effective management
- – engage in management of extension organizations

Syllabus for Minor Courses

      I. **Course Title**   : **Enabling Innovation**

      II. **Course code**   : **EXT 509**

      III. **Credit Hours : 1+1**

      IV. **Why this course?**

An effective process of agricultural innovation is a pre-condition for meeting the global challenge of feeding the growing world population and reducing poverty. Ideas about innovation have evolved considerably over the past 4 decades. A frequently used term in the discussions around innovation in agriculture is 'Agricultural Innovation Systems' (AIS). The AIS is increasingly recognized as a useful framework to diagnose innovation capacity, design investment and organise scaling up interventions. Extension and Advisory Services (EAS) are integral to AIS. Extension professionals should have sound knowledge on how to scale up new knowledge and thereby enabling innovation and impact and their roles in strengthening AIS. This course aims to provide these perspectives.

V. Aim of the course

The aim of this course is to introduce the new perspectives related to "innovation" and help learners to apply the AIS framework especially in dealing with scaling up knowledge. It discusses the different ways to explore AIS including the roles of different actors and the enabling environment (including institutions and policies) in enabling innovation. The course also aims to broaden the understanding of students in scaling up knowledge and orient students to varied tools and approaches to scaling up The course is organized as follows:

No	Blocks	Units
1	Agricultural Innovation Systems	1. Agricultural Innovation Systems: Concepts and Elements
		2. Enabling Innovation

2. Scaling Up Knowledge

for Innovation   1.Scaling Up: Tools, Approaches and   Pathways

VI. **Theory**

Block 1: Agricultural Innovation Systems

Unit 1: Agricultural Innovation Systems: Concepts and Elements

Origins of the innovation systems concept-Innovation vs Invention; Agricultural Innovation System (AIS) -ToT, FSR, AKIS and AIS compared, Key insights from AIS: How Innovation takes place; Role of different actors in AIS; Importance of interaction and knowledge flows among different actors, Role of Communication in Innovation Process; Role of Extension in AIS, Different views to analyze AIS: structural view, functional view, process view and capacity view.

Unit 2: Enabling Innovation

Role of enabling environment: Policies and institutions in enabling innovation; Role of Government-Innovation Policy: Achieving coordination and policy coherence; Innovation Platforms; Role of Innovation Brokers, Methodologies for AIS Diagnosis: Typologies of existing methodologies-strengths and limitations; Assessing Extension and Advisory Services within AIS; Capacity Development in AIS: Strengthening capacities to innovate.

Block 2: Scaling Up Knowledge for Innovation

Unit 1: Scaling Up: Tools, Approaches and Pathways

Scaling Up: Definitions; Changing views on scaling up: Approaches to Scaling Up: Push, pull, plant, probe: Scaling up pathways: Drivers and spaces for scaling up; Framework and Tools for Scaling up: Planning and implementing a scaling up pathways; Scalability assessment tools; Role of policies in scaling up: Influencing policies for scaling up; Innovation Management for scaling up knowledge and implications for Extension and Advisory Services.

VII. **Practical**

• Identify one crop/commodity sector and use AIS framework to diagnose actors and their roles, patterns of interaction, institutions determining interaction and the enabling policy environment and develop a AIS Diagnosis Report (Review and Key informant interviews)

• Undertake a case study on a successful case of scaling up knowledge and identify factors that contributed to its success

• Identify one specific knowledge (a technology, an approach) that has been recently introduced and

develop an Up scaling Strategy

Teaching methods/activities

– Lecture

– Assignment (Reading/Writing)

– Student's Book/Publication Review

– Student presentation

– Group Work

IX. Learning outcome

After successful completion of this course, the students are expected to be able to:

– Appreciate and apply AIS framework in different contexts

– Enhance their knowledge and skills related to enabling innovation

– Diagnose AIS and design interventions for improvement and

– Design scaling up strategies to achieve innovation and impact

I. Course Title : Gender Mainstreaming

II. Course Code : EXT 510

III. Credit Hours : 2+1

IV. Why this course?

Gender as a concept has gained well deserved attention globally. Development planners and policy makers have realized that gender implications need to be considered while planning and implementing programmes and projects for their desired impacts. Conversely, the impacts of programmes on men and women also vary due to their different socially ascribed roles and responsibilities. Extension professionals need to understand the concept of gender and its implications on agricultural and rural development and their skills need to be built for critically identifying and analysing gender implications. This course is designed to meet these requirements.

V. Aim of the course

- To orient students on the importance of "Gender mainstreaming" as well as the other concepts related to gender. The students will be able to understand the gender roles and responsibilities and how in the present times, the roles may be shifting

- To discuss ways and various techniques for conducting gender analysis theoretically and practically as well as the prerequisites for gender analysis

- To develop capacities for identifying and addressing gender implications in all development programmes related to agriculture and allied sectors, climate change adaptation and livelihood security, as well as addressing gender issues through application of extension methods including PRA and PLA

The course is organized as follows:

No	Blocks	Units
1.	Why Gender Matters	1. Historical Perspective of Gender 2.Agrarian Importance of Gender
2.	Gender Related Concepts, Analysis, Technology	1. Gender Related Concepts and Divides Gender and 2. Gender Analysis 3.Gender and Technology
3.	Gender Mainstreaming and Women Empowerment	1. Gender Mainstreaming 2. Women Empowerment 3.Global Best Practices, Policies and Frameworks 4.Entrepreneurship Development for Women

VI.   **Theory**

Block 1: Why Gender Matters?

Unit 1: Historical Perspective of Gender

Historical perspective of gender: Feminism and emergence of gender as a concept, Scope of gender studies in agriculture and rural development

Unit 2: Agrarian Importance of Gender

Agrarian Importance of Gender: Understanding the importance of gender in national and global agriculture-Key gender issues and challenges in agriculture - Gender and value chain- Global actions to address gender-needs and strategies to address gender and women empowerment.

Block 2: Gender Related Concepts, Analysis, Gender and Technology

Unit 1: Gender Related Concepts and Divides

Gender related concepts and divides: Understanding of the concepts of gender, gender equality and equity, gender balance, gender blindness, gender relations, gender neutrality, gender bias and

discrimination, gender rights, gender roles and responsibilities. Gender budgeting, Gender divides and their implications such as gender digital divide, gender access to resources and inputs divide, gender mobility divide, gender wage divide, Gender needs: practical and strategic.

Unit 2: Gender Analysis

Gender analysis: Importance, usage, prerequisites, techniques of gender analysis- Tools for gender analysis.

Unit 3: Gender and Technology

Gender and technology: How gender and technology impact each other, Gender neutral technology, Gender sensitive technology, Gender supportive assistance in technology adoption-Gender in agricultural research and extension.

Block 3: Gender Mainstreaming and Women Empowerment

Unit 1: Gender Mainstreaming

Gender mainstreaming: Importance of gender mainstreaming in agriculture, Extension strategies to address gender issues such as gender and health, nutrition, gender in agricultural value chains, gender and climate change adaptation, gender and globalization& liberalization for mainstreaming gender concerns into the national programmes and policies.

Unit 2: Women Empowerment

Women Empowerment: Importance of women empowerment, Current national women empowerment and gender indices. Women empowerment approaches (technological, organizational, political, financial, social, legal and psychological), Case studies based on experiences and learning from various development and rural development programmes.

Unit 3: Global Best Practices, Policies and Frameworks

Global Best Practices, Policies and Frameworks: Global best practices, women empowerment and gender mainstreaming models and frameworks for addressing gender concerns in agriculture, approaches of various organizations: gender mainstreaming and special women focused programmes in agriculture and rural development.

Unit 4: Entrepreneurship Development for Women

Entrepreneurship development for women: Women entrepreneurship development in agriculture and agro processing: current status, women led enterprises, supporting organizations and schemes, Govt. policies, entrepreneurship development programme and process for women in agriculture.

VII. Practicals

- Visit to a village for understanding rural gender roles and responsibilities as groups, followed by class presentation by groups
- Exercise for capturing shifts in gender roles and responsibilities
- Conducting gender analysis in a village using gender analysis techniques
- Visit to agencies supporting women empowerment followed by report presentation.
- Each student to visit a different organization such as State Rural Livelihood Mission, Women Development Corporation, Department of Agriculture, Important NGOs working for women empowerment
- Exercise for identification and prioritization of issues affecting/needs for women empowerment
- Interaction with a successful women entrepreneur/ SHG

VIII. Teaching methods/activities

- Lecture
- Assignment (Reading/Writing)
- Student's Book/Publication Review
- Student presentation
- Group Work
- Student's interview of key policy makers
- Case Analysis
- Guest Lectures
- Review of policy documents
- Short attachments

IX. Learning outcome

After successful completion of this course, the students are expected to be able to:

- Appreciate the importance of addressing agrarian gender concerns in the context of sustainable livelihoods and national development
- Understand the various concepts related to gender and the application of these concepts for women empowerment and gender mainstreaming
- Critically evaluate the various agricultural development, rural development programmes,

schemes, policies and strategies for women empowerment within the context of achieving gender equity

- How to engage in gender analysis and collect and analyse sex-disaggregated data for developing strategies for women empowerment and gender mainstreaming

Syllabus of Common subjects

PGS 501 TECHNICAL WRITING AND COMMUNICATIONS SKILLS (0+1)

Objective

To equip the students/ scholars with skills to write dissertations, research papers, etc. To equip the students/ scholars with skills to communicate and articulate in English (verbal as well as writing).

Practical (Technical Writing)

- Various forms of scientific writings- theses, technical papers, reviews, manuals, etc.;
- Various parts of thesis and research communications (title page, authorship contents page, preface, introduction, review of literature, material and methods, experimental results and discussion);
- Writing of abstracts, summaries, précis, citations, etc.;
- Commonly used abbreviations in the theses and research communications;
- Illustrations, photographs and drawings with suitable captions; pagination, numbering of tables and illustrations;
- Writing of numbers and dates in scientific write-ups;
- Editing and proof-reading;
- Writing of a review article;
- Communication Skills - Grammar (Tenses, parts of speech, clauses, punctuation marks);
- Error analysis (Common errors), Concord, Collocation, Phonetic symbols and transcription;
- Accentual pattern: Weak forms in connected speech;
- Participation in group discussion;
- Facing an interview;
- Presentation of scientific papers.

PGS 502: LIBRARY AND INFORMATION SERVICES (0+1)

Objective

To equip the library users with skills to trace information from libraries efficiently, to apprise them of information and knowledge resources, to carry out literature survey, to formulate information search strategies, and to use modern tools (Internet, OPAC, search engines, etc.) of information search.

Practical

Introduction to library and its services; Role of libraries in education, research and technology transfer; Classification systems and organization of library; Sources of information- Primary Sources, Secondary Sources and Tertiary Sources; Intricacies of abstracting and indexing services (Science Citation Index, Biological Abstracts, Chemical Abstracts, CABI Abstracts, etc.); Tracing information from reference sources; Literature survey; Citation techniques/ Preparation of bibliography; Use of CD-ROM Databases, Online Public Access Catalogue and other computerized library services; Use of Internet including search engines and its resources; e- resources access methods.

PGS 503 INTELLECTUAL PROPERTY AND ITS MANAGEMENT IN AGRICULTURE (1+0)

Objective

The main objective of this course is to equip students and stakeholders with knowledge of Intellectual Property Rights (IPR) related protection systems, their significance and use of IPR as a tool for wealth and value creation in a knowledge- based economy.

Theory

Historical perspectives and need for the introduction of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement; Intellectual Property and Intellectual Property Rights (IPR), benefits of securing IPRs; Indian Legislations for the protection of various types of Intellectual Properties; Fundamentals of patents, copyrights, geographical indications, designs and layout, trade secrets and traditional knowledge, trademarks, protection of plant varieties and farmers' rights and biodiversity protection; Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection; National Biodiversity protection initiatives; Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture; Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement.

PGS 504 BASIC CONCEPTS IN LABORATORY TECHNIQUES (0+1)

Objective

To acquaint the students about the basics of commonly used techniques in laboratory.

Practical

• Safety measures while in Lab;

• Handling of chemical substances;

• Use of burettes, pipettes, measuring cylinders, flasks, separatory funnel, condensers, micropipettes and vaccupets;

• Washing, drying and sterilization of glassware;

• Drying of solvents/ chemicals;

• Weighing and preparation of solutions of different strengths and their dilution;

• Handling techniques of solutions;

• Preparation of different agro-chemical doses in field and pot applications;

• Preparation of solutions of acids;

• Neutralisation of acid and bases;

• Preparation of buffers of different strengths and pH values;

• Use and handling of microscope, laminar flow, vacuum pumps, viscometer, thermometer, magnetic stirrer, micro-ovens, incubators, sandbath, waterbath, oilbath;

• Electric wiring and earthing;

• Preparation of media and methods of sterilization;

• Seed viability testing, testing of pollen viability;

• Tissue culture of crop plants;

• Description of flowering plants in botanical terms in relation to taxonomy.

PGS 505 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/ Non-Governmental Organisations. Critical evaluation of rural development policies and programmes. Constraints in implementation of rural policies and programmes.

Syllabus for supporting courses

     I.   **Course Title**   **: Statistical Methods for Applied Sciences**

    II. **Course Code**   **: STAT 502**

   III. **Credit Hours**   **: 2+1**

   IV. **Aim of the course**

This course is meant for students who do not have sufficient background of Statistical Methods. The students would be exposed to concepts of statistical methods and statistical inference that would help them in understanding the importance of statistics. It would also help them in understanding the concepts involved in data presentation, analysis and interpretation. The students would get an exposure to presentation of data, probability distributions, parameter estimation, tests of significance, regression and multivariate analytical techniques.

V. Theory

Unit I

Box-plot, Descriptive statistics, Exploratory data analysis, Theory of probability, Random variable and mathematical expectation.

Unit II

Discrete and continuous probability distributions, Binomial, Poisson, Negative Binomial, Normal distribution, Beta and Gamma distributions and their applications. Concept of sampling distribution: chi-square, t and F distributions. Tests of significance based on Normal, chi-square, t and F distributions.

Unit III

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.

Unit IV

Non-parametric tests – sign, Wilcoxon, Mann-Whitney U-test, Run test for the randomness of a sequence. Median test.

Unit V

Introduction to ANOVA: One way and Two Way, Introduction to Sampling Techniques, Introduction to Multivariate Analysis, Transformation of Data.

VI. Practical

• Exploratory data analysis, fitting of distributions ~ Binomial, Poisson, Negative Binomial, Normal.
• Large sample tests, testing of hypothesis based on exact sampling distributions ~ chi square, t and F.
• Confidence interval estimation and Correlation and regression analysis, fitting of Linear and Quadratic Model.
• Non-parametric tests. ANOVA: One way, Two Way, SRS.

 I. **Course Title : Information Technology in Agriculture**
 II. **Course Code : MCA 512**
III. **Credit Hours : 2+0**

Aim of the course

This is a course on Introduction to Networking and Internet Applications that aims at exposing the students to understand analogy of computer, basic knowledge of MS Office. Also to understand Internet and WWW, use of IT application and different IT tools in Agriculture

I. Theory

Unit I

Introduction to Computers, Anatomy of computer, Operating Systems, definition and types, Applications of MS Office for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions,

Unit II

Database, concepts and types, uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components, Introduction to computer programming languages, concepts and standard input/output operations. e-Agriculture, concepts and applications,

Unit III

Use of ICT in Agriculture, Computer Models for understanding plant processes. IT application for computation of water and nutrient requirement of crops, Computer- controlled devices (automated systems) for Agri-input management, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc.,

Unit IV

Geospatial technology for generating valuable agri-information. Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc. for supporting Farm decisions, Preparation of contingent crop-planning using IT tools.