# POST GRADUATE DEPARTMENT OF AGRICULTURE

## SYLLABUS FOR THE BATCH FROM THE YEAR 2024 TO YEAR 2026

**Programme Code: MEXT**

**Programme Name: M.Sc. Ag. (Agricultural Extension and Communication)**

**(Semester I- IV)**
**Examinations: 2024-25**

# Khalsa College, Amritsar

## PROGRAMME OBJECTIVES

1. To Plan, communicate and impart farm technologies and entrepreneurial orientation effectively to empower farmers.
2. To plan, conduct the research and find out the solutions for the problems in an ecological and ethical manner.
3. To identify, develop and manage human resources in an organizational environment.
4. To understand agricultural policies, globalization and their impact on sustainable development, organic farming techniques.

**PROGRAMME SPECIFIC OUTCOMES:**

**PSO1:** To plan, communicate and impart farm technologies and entrepreneurial orientation effectively to empower farmers.

**PSO2:** To plan, conduct the research and find out the solutions for the problems in an ethical manner.

**PSO3:** To become excellent teachers, efficient extension workers, farm journalists and visual communication specialists equipped with the skills in using modern ICT tools, advanced AV aids, teaching methods and also with journalistic and advertising skills.

**PSO4:** To identify, develop and manage human resources in an organizational environment.

**PSO5:** To plan, start and mange new entrepreneurial ventures successfully.

## M.Sc. Ag. (Agricultural Extension and Communication)

### SEMESTER-I

| Course Code | Course Title | Credit Hours | Marks<br>Theory + Practical + I. Assessment | Total Marks | Page No. |
|---|---|---|---|---|---|
| EXT-511 | Extension Landscape | 3 (3+0) | 75+0+25 | 100 | 8-9 |
| EXT-512 | Applied Behavior Change | 3 (2+1) | 50+25+25 | 100 | 10-11 |
| AGR-511 | Modern Concepts in Crop Production | 3(3+0) | 75 + 0 +25 | 100 | 12 |
| STAT-511 | Statistical Methods for Applied Sciences/Social Sciences | 4(3+1) | 57 + 18 +25 | 100 | 13-14 |
| *PGS-511 | Technical Writing & Communications Skills | 1(0+1) | 100 (Pr) | 100 | 15 |
| *PGS-512 | Library and Information Services | 1(0+1) | 100 (Pr) | 100 | 16 |
| *EXT-599 | Masters' Research | 5(0+5) | -- | S/US | 17 |
| **Total** | | **20 (13+7*)** | | | |

* Non-credit course.

Total Internal Assessment = 25 Marks (House Test - 10 Marks; Attendance – 10 Marks; Conduct & Academic, Extra Curricular Activities – 5 Marks).

## M.Sc. Ag. (Agricultural Extension and Communication)

### SEMESTER-II

| Course Code | Course Title | Credit Hours | Marks<br>Theory + Practical + I. Assessment | Total Marks | Page No. |
|---|---|---|---|---|---|
| EXT-521 | Organizational Behaviour Development | 3(2+1) | 50+25+25 | 100 | 18-20 |
| EXT-522 | Research methodology in Extension | 3(2+1) | 50+25+25 | 100 | 21-23 |
| EXT-523 | ICT's for Agricultural Extension and Advisory Services | 3(2+1) | 50+25+25 | 100 | 24-25 |
| EXT-524 | Gender Mainstreaming | 3(2+1) | 50 + 25 +25 | 100 | 26-27 |
| *PGS-521 | Agricultural Research, Research Ethics and Rural Development Programmes | 1(1+0) | 100 (Th) | 100 | 28 |
| *EXT-599 | Masters' Research | 5(0+5) | -- | S/US | 29 |
| **Total** | | **18 (12+6*)** | | | |

* Non-credit course.

Total Internal Assessment = 25 Marks (House Test - 10 Marks; Attendance – 10 Marks; Conduct & Academic, Extra Curricular Activities – 5 Marks).

**M.Sc. Ag. (Agricultural Extension and Communication)**

## SEMESTER-III

| Course Code | Course Title | Credit Hours | Marks | Total Marks | Page No. |
|---|---|---|---|---|---|
| | | | Theory+Practical + I. Assessment | | |
| EXT-531 | Capacity development | 3 (2+1) | 50+25+25 | 100 | 30-32 |
| EXT-532 | Managing Extension Organizations | 3(2+1) | 50+25+25 | 100 | 33-34 |
| STAT-522 | Data Analysis using Statistical Packages | 3(2+1) | 50+25+25 | 100 | 35 |
| EXT-591 | Credit seminar | 1(1+0) | 100 | 100 | 36 |
| *PGS-531 | Intellectual Property & management Agriculture | 1(1+0) | 100(Th) | 100(N | 37 |
| *EXT-599 | Masters' Research | 10(0+10) | -- | S/US | 38 |
| **Total** | | **21 (10+11*)** | | | |

* Non-credit course.

Total Internal Assessment = 25 Marks (House Test - 10 Marks; Attendance – 10 Marks; Conduct & Academic, Extra Curricular Activities – 5 Marks).

## M.Sc. Ag. (Agricultural Extension and Communication)

### SEMESTER-IV

| Course Code | Course Title | Credit Hours | Marks | Total Marks | Page No. |
|---|---|---|---|---|---|
| | | | Theory + Practical + I. Assessment | | |
| EXT-541 | Evaluation and Impact Assesment | 3(2+1) | 50+25+25 | 100 | 39-41 |
| *PGS-541 | Basic concepts in Laboratory Techniques | 1(0+1) | 100 (Pr) | 100 | 42 |
| *EXT-599 | Masters' Research | 10(0+10) | -- | S/US | 43 |
| **Total** | | **14 (11+3*)** | | | |

* Non-credit course.

Total Internal Assessment = 25 Marks (House Test - 10 Marks; Attendance – 10 Marks; Conduct & Academic, Extra Curricular Activities – 5 Marks).

## SEMESTER-I

**EXT-511** **Extension Landscape**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 75**

**Practical: 0**

**Internal assessment: 25**

**Credit hours: 3(3+0)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 15 marks (Comprising of 10 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All questions will carry equal marks (15).

**Course objectives:** The course helps 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.

**Course contents**

**Theory**

**Section-A:** 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. New Capacities needed by extension and advisory services at different 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).

**Section-B:** Pluralism in Extension Delivery: Role of private sector (input firms, companies, consultant firms and individual consultants)- Trends in the of private extension and advisory services in India and other countries; 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 service providers; global experiences with use of media and ICTs in advisory services provision.

**Section-C:** Diffusion of Innovations paradigm- strengths and limitations; multiple farmer- 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. Evolution and features of extension approaches: Transfer of technology ie 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. Reduction in public funding: public withdrawal from extension provision. 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).

**Section-D:** Pluralism: Managing pluralism and Co-ordination of pluralistic extension ,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.

**Suggested Reading:**


- Eiser J, Richard (2011) Social Psychology: Attitudes, Cognition and Social Behaviour. Cambridge: Cambridge University Press. (First Edition, 1986)
- Eysenck M W and Keane M T (2010) Cognitive psychology: A student's handbook. Sixth Edition, Hove: Psychology Press.
- Feldman R S (2008) Essentials of understanding psychology (7th ed.). Boston: McGraw-Hill. Gilovich T, Keltner D, and Nisbett R E (2011) Social psychology. New York: W.W. Norton & Co.
- Moreno R (2010) Educational Psychology. Hoboken, NJ: John Wiley & Sons Inc.
- Nevid J S (2012) Essentials of psychology: Concepts and applications Belmont, CA: Wadsworth, Cengage Learning.


**Course outcomes**

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.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-I**

**EXT-512 Applied Behavior Change**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 50**

**Practical: 25**

**Internal assessment: 25**

**Credit hours: 3(2+1)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 10 marks (Comprising of 10 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All question will carry equal marks (10).

**Course objective:** The objective of this course is 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.

**Theory**

**Section-A:** 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.

**Section-B:** Cognitive Processes And Learning :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. 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.

**Section-C :** 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, Selfregulated learning; learning styles – meaning, types and applications in learning. Judgement, Choice

**Section-D**: 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. Human Behaviour in the Society: 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. Social Judgement, Social Identity and Inter-Group Relations Social judgement – meaning, frame of reference, stereotyping; The judgement 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.

**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.

**Suggested Reading:**


- Eiser J, Richard (2011) Social Psychology: Attitudes, Cognition and Social Behaviour. Cambridge: Cambridge University Press. (First Edition, 1986)
- Eysenck M W and Keane M T (2010) Cognitive psychology: A student's handbook. Sixth Edition, Hove: Psychology Press.
- Feldman R S (2008) Essentials of understanding psychology (7th ed.). Boston: McGraw-Hill. Gilovich T, Keltner D, and Nisbett R E (2011) Social psychology. New York: W.W. Norton & Co.
- Moreno R (2010) Educational Psychology. Hoboken, NJ: John Wiley & Sons Inc.
- Nevid J S (2012) Essentials of psychology: Concepts and applications Belmont, CA: Wadsworth, Cengage Learning.


**Course outcomes:**

After the completion of this course students will be able to:

- Understand the biological and cognitive processes determining human behavior.
- 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 behavior.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-I**

**AGR-511 Modern Concepts in Crop Production**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 75**

**Internal assessment: 25**

Credit hours: 3(3+0)

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 15 marks (Comprising of 10 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All questions will carry equal marks (15).

**Course objective:** To teach the basic concepts of soil management and crop production.

**Course contents**

**Theory**

**Section-A:** Crop growth analysis in relation to environment; geo-ecological zones of India. Quantitative agro-biological principles and inverse yield nitrogen law; Mitscherlich yield equation, its interpretation and applicability; Baule unit.

**Section-B:** 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.

**Section- C:** 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.

**Section-D**: Integrated farming systems, organic farming, and resource conservation technologyincluding modern concept of tillage; dry farming; determining the nutrient needs for yield potentiality of crop plants, concept of balance nutrition and integratednutrient management; precision agriculture.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.

**Suggested Reading**


- Balasubramaniyan P and Palaniappan SP. 2001. Principles and Practices of Agronomy. Agrobios.
- Fageria NK. 1992. Maximizing Crop Yields. Marcel Dekker.
- Havlin JL, Beaton JD, Tisdale SL and Nelson WL. 2006. Soil Fertility and Fertilizers. 7th Restructured and Revised Syllabi of Post-graduate Programmes Vol. 2 48 Ed. Prentice Hall.
- Paroda R.S. 2003. Sustaining our Food Security. Konark Publ.
- Reddy SR. 2000. Principles of Crop Production. Kalyani Publ.
- Sankaran S and Mudaliar TVS. 1997. Principles of Agronomy. The Bangalore Printing & Publ. • Singh SS. 2006. Principles and Practices of Agronomy. Kalyani


**Course outcome:**

- Basic knowledge on soil management and crop production.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-I**

**STA-511 Statistical Methods for Applied Sciences/ Social Sciences**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 57**

**Practical: 18**

**Internal assessment: 25**

**Credit hours: 4(3+1)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 9 marks (Comprising of 9 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All question will carry equal marks (12).

**Course objective:** Objective of this course is to acquaint the students with the use of various statistical methods which are used to analyze the research data which will further help the students in better interpretation of the results.

**Course contents:**

**Theory**

**Section-A:** Box-plot, Descriptive statistics:- measures of central tendency, dispersion, Theory of probability:- types and introduction, Introduction to Random variable and Mathematical expectation and their properties.

**Section-B:** Discrete and continuous probability distributions:- Binomial, Poisson, Normal distribution 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.

**Section-C:** 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.

**Section-D:** Non-parametric tests:- sign, Mann-Whitney U-test, Run test for the randomness of a sequence, Median test:- introduction and their applications. Introduction to ANOVA: One way and Two Way, Introduction to Sampling Techniques:- SRS, cluster, stratified, systematic sampling:- introduction and their applications, Transformation of Data.

**Practical:**

Fitting of distributions ~ Binomial, Poisson, Normal. Large sample tests, testing of hypothesis based on exact sampling distributions ~ chi-square, t and F. Correlation and regression analysis. Non-parametric tests. ANOVA: One way, Two Way.

**Suggested Reading:**


- Goon A.M, Gupta M.K and Dasgupta B. 1977. An Outline of Statistical Theory. Vol. I. The World Press.
- Goon A.M, Gupta M.K. and Dasgupta B. 1983. Fundamentals of Statistics. Vol. I. The World Press.
- Hoel P.G. 1971. Introduction to Mathematical Statistics. John Wiley.
- Hogg R.V and Craig T.T. 1978. Introduction to Mathematical Statistics. Macmillan.
- Morrison D.F. 1976. Multivariate Statistical Methods. McGraw Hill.
- Hogg RV, McKean JW, Craig AT. 2012. Introduction to Mathematical Statistics 7th Edition.
- Siegel S, Johan N & Casellan Jr. 1956. Non-parametric Tests for Behavior Sciences. John Wiley.
- Anderson TW. 2009. An Introduction to Multivariate Statistical Analysis, 3rd Ed. John Wiley
- http://freestatistics.altervista.org/en/learning.php.
- http://www.statsoft.com/textbook/stathome.html.


**Course outcomes:**

After the successful completion of this course students will:

- Get knowledge on the concept of probability, sampling techniques, mean, standard error etc.
- Understand the correction and regression analysis.
- Apply T-Test, chi-square and large sample tests.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-I**

***PGS-511 Technical Writing & Communications Skills**

**Time: 3 Hours** **Maximum marks: 100**

**Practical: 100**

**Credit hours: 1(0+1)**

**Instructions for the Paper Setters:**

1. The question paper will consist of nine skill-oriented questions.
2. The first 5 questions carry 8 marks each. There will be internal choice wherever possible. The answer should be in 50-80 words. (5×8=40 Marks)
3. There will be four essay type questions from the entire syllabus. There will be internal choice wherever possible. The answer should be in 250 words. (4×15= 60 Marks)

**Course objectives:** 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).

**Course contents:**

**Practical:**

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, punctuationmarks);Erroranalysis(Commonerrors),Concord,Collocation,Phonetic symbols and transcription; Accentual pattern: Weak forms in connected speech; Participation in group discussion; Facing an interview; Presentation of scientific papers.

**Suggested Reading:**


- Chicago Manual of Style. 14th Ed. 1996. Prentice Hall of India.
- Harper Collins. Gordon HM and Walter JA. 1970. Technical Writing. 3rd Ed.
- James HS. 1994. Handbook for Technical Writing. NTC Business Books.
- Joseph G. 2000. MLA Handbook for Writers of Research Papers. 5th Ed. Affiliated East-West Press.
- Richard WS. 1969. Technical Writing.
- Sethi J and Dhamija PV. 2004. Course in Phonetics and Spoken English. 2nd Ed.
- Prentice Hall of India.


**Course outcomes:** After the successful completion of this course students will be able to:

- Understand various stages of the writing process and apply them to technical and workplace writing tasks
- Integrate material collected from primary and secondary sources with their own ideas in research papers

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-I**

***PGS-512 Library & Information Services**

**Time: 3 Hours** **Maximum marks: 100**

**Practical: 100**

**Credit hours: 1(0+1)**

**Instructions for the Paper Setters:**

1. The question paper will consist of nine skill-oriented questions.
2. The first 5 questions carry 8 marks each. There will be internal choice wherever possible. The answer should be in 50-80 words. (5×8=40 Marks)
3. There will be four essay type questions from the entire syllabus. There will be internal choice wherever possible. The answer should be in 250 words. (4×15= 60 Marks)

**Course 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.

**Course outcomes:**

- Understand the definitions, descriptions, process explanations and other common forms of technical writing.
- Understand how to follow the stages of the writing process and apply them to technical and workplace writing tasks
- Synthesize and integrate material collected from primary and secondary sources with their own ideas while writing research papers.

## M.Sc. Ag. (Agricultural Extension and Communication)

### SEMESTER-I

***EXT-599** ***Masters' Research**

**S/US**

**Credits hours: 5(0+5)**

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-II**

**EXT-521 Organizational Behavior Development**

**Time: 3 Hours**

**Maximum marks: 100**
**Theory: 50**
**Practical: 25**
**Internal assessment: 25**
**Credit hours: 3(2+1)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 10 marks (Comprising of 10 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All questions will carry equal marks (10).

**Course objective:** objective of this course is to understand the theory and practice relating to the processes of organizational behavior, development and change. It will help in developing insight and competence in diagnostic and intervention processes and skills for initiating and facilitating change in organizations. It will also gain necessary self-insight, skills in facilitation, organizational development (OD) skills, group process and techniques, to become an effective change agents and OD consultants.

**Course contents:**

**Theory**

**Section-A:** 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. Basics of Organizational Behaviour Concepts of Organisational Behaviour, Scope, Importance, Models of OB. 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.

**Section-B:** 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 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.

**Section-C:** 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.

**Section-D:** Organisational Development Overview of Organizational Development Concept of OD, Importance and Characteristics, Objectives of OD, History and Evolution of OD, Implications of OD Values. 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. Organizational Development Interventions Meaning, Importance, Characteristics of Organization development Interventions, Classification of OD Interventions-Interpersonal interventions, Team Interventions, Structural Interventions, Comprehensive Interventions. 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.

**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.

**Suggested reading**


- Bhattacharyya DK (2011) Organizational Change and Development, Oxford University Press. Hellriegel D, Sloccum JW and Woodman. 2001. Organizational Behaviour. Cincinnati, Ohio: South-Western College Pub.
- Luthans F (2002) Organizational Behaviour. Tata McGraw-Hill, New York
- Newstrom JW and Davis K. (2002) Organizational Behaviour: Human behaviour at Work. TataMcGraw Hill, New Delhi.
- Peter M S (1998) The Fifth Discipline: The Art and Practice of Learning Organization. Random House, London.
- Pradip N K (1992) Organizational Designs for Excellence. Tata McGraw Hill, New Delhi.
- Shukla, Madhukar (1996) Understanding Organizations. Prentice Hall of India, New Delhi.
- Stephens PR and Timothy AJ (2006) Organizational Behaviour, 12th Edition. Prentice Hall Pub.
- Thomas GC and Christopher GW. (2013) Organizational development and change, 10th edition, South-Western college publishing.

- Wendell LF and Cecil HB (1999) Organizational Development: Behavioural science interventions for organization improvement, Pearson. 368 pp.


**Course outcomes:**

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.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-II**

**EXT-522 Research Methodology in Extension**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 50**

**Practical: 25**

**Internal assessment: 25**

**Credit hours: 3(2+1)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 10 marks (Comprising of 10 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All question will carry equal marks (10).

**Course objectives:** 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.

**Course contents:**

**Theory**

**Section-A:** 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. 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.

**Section-B:** Steps in Behavioural Research Process 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. 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 literatured tools. 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.

**Section-C:** Measurement – Meaning, levels of measurement – nominal, ordinal, interval and ratio; Criteria for choosing measurement levels for variables. 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. 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; Nonprobability 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. Collecting Data The process of collecting data – Selection, training, supervision, and evaluation of field investigators; Online data collection; Errors and biases during data collection.

**Section-D:** 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. 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. Reporting and Evaluating Research Writing reports and research publications; Evaluation Methodology.

**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.

- **Suggested readings**

- Kerlinger FN and Lee HB. 2000. Foundations of Behavioral Research. Orlando, FL: Harcourt College Publishers.
- Kumar R. 2014. Research Methodology: A Step- by- Step Guide for Beginners. Fourth. Edition. Thousand Oaks, California: Sage Publications.
- Malhotra NK. 2010. Marketing research: An applied orientation. Sixth Edition. Upper Saddle River, NJ: Prentice Hall.
- NeumanWL. 2006. Social Research Methods: Qualitative and Quantitative Approaches. Toronto: Pearson.
- Sekaran U and Bougie R. 2013. Research Methods for Business A Skill-Building Approach. 6th Edition, Wiley, New York.


**Course outcomes:**

- 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.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-II**

**EXT-523 ICT's for Agricultural Extension and Advisory Services**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 50**

**Practical: 25**

**Internal assessment: 25**

**Credit hours: 3(2+1)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 10 marks (Comprising of 10 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All question will carry equal marks (10).

**Course objective**: The objectives of the course is to discuss different ICT initiatives, knowledge management process and application aspects. It will also orient students on advances in smart/ disruptive technologies and data analytics as well as helps them to have hands on experience in navigating ICTs

**Course contents:**

**Theory**

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

**Section-B:** 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.) Expert System/ Decision Support System/ Management Information Systems, Farm Health Management & Intelligence System for Plant Health, Animal Health, Soil Health, Fishery, Water, Weather, etc.

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

**Section-D:** 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, activitycentered design, systems design, and genius design; Methods of interactive design - Usability testing methods.

**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

**Suggested readings:**


- Fafchamps M and Minten B (2012) Impact of SMS based Agricultural Information on Indian Farmers. The World Bank Economic Review, Published by the Oxford University Press on behalf of the International Bank for Reconstruction and Development.
- FAO (2011) E-learning methodologies a guide for designing and developing e-learning courses. Food and Agriculture Organization of the United Nations. http://www.fao.org/docrep/015/i2516e/i2516e.pdf
- Heike Baumüller (2018) The little we know: An exploratory literature review on the utility of mobile phone enabled services for smallholder farmers. Journal of International Development. 30, 134–154.


**Course outcomes:**

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

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-II**

**EXT-524 Gender Mainstreaming**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 50**

**Practical: 25**

**Internal assessment: 25**

Credit hours: 3(2+1)

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 10 marks (Comprising of 10 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All question will carry equal marks (10).

**Course objectives**: course objective is to tto 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.

**Course contents:**

**Theory**

**Section-A:** Historical perspective of gender: Feminism and emergence of gender as a concept, Scope of gender studies in agriculture and rural development. 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. 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.

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

**Section-C:** 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. 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.

**Section-D:** 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.

**Practical**

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.

**Suggested readings**


- Sahoo RK and Tripathy SN. 2006. *SHG and Women Empowerment.* Anmol Publ.
- Sinha K. 2000. *Empowerment of Women in South Asia*. Association of Management Development
- Institute in South Asia, Hyderabad.
- **RRW-** Reaching Rural Women– http://www.reachingruralwomen.org/
- **UN WOMEN**– http://www.unwomen.org/en


**Course outcomes:**

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.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-II**

***PGS-521 Agricultural Research , Research Ethics and Rural Development Programmes**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 100**

**Credit hours: 1 (1+0)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of five questions, out of which first question of 20 marks (Comprising of 10 short answer type questions of 2 mark each) covering the whole syllabus will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All question will carry equal marks (20).

**Course objective:** the main objective of the course is 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.

**Course Contents:_Theory:**

**Section A:** 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):

**Section B:** International Agricultural Research Centres (IARC), partnership with NARS, role as a partner in the global agriculture research system, strengthening capacities at national and regional levels; International fellowships for scientific mobility. Research ethics: research integrity, research safety in laboratories, welfare of animals used in research, computer ethics, standards and problems in research ethics.

**Section C:** 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,

**Section D:** 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.

**Suggested Readings:**


- Punia MS. Manual on International Research and Research Ethics. CCS HaryanaAgricultural University, Hisar.
- Rao BSV. 2007. Rural Development Strategies and Role of Institutions - Issues,Innovations and Initiatives. Mittal Publ.


**Course Outcomes:**

After successful competeion of this course students are expected:

- To be familiar with the national and international institutions involved in research and about various research ethics and the problems faced by researchers.
- To be aquainted with the various rural development programmes and the problems being faced in the implementation of the policies designed for rural development.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-III**

***EXT-599 *Masters' Research**

**S/US**

**Credits hours: 5(0+5)**

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-III**

**EXT-531` Capacity Development**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 50**

**Practical: 25**

**Internal assessment: 25**

**Credit hours: 3(2+1)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 10 marks (Comprising of 10 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All questions will carry equal marks (10).

**Course objectives:** Objective of this course is to understand the concepts of training, capacity building, capacity development and human resource development in the context of roles and responsibilities of extension professionals. It also aims at discussing capacity development- approaches, strategies, needs assessment and methods / tolls. It will also help the students to devise, organize, implement and evaluate capacity development programmes.

**Course contents:**

**Theory**

**Section-A:** 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.

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

**Section-C:** 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. 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). 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. Evaluation.

**Section-D:** 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. 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. 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.

**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.

**Suggested reading:**


- Mbabu A N and Hall A (2012) Capacity Building for Agricultural Research For Development Lessons from Practice in Papua New Guinea. United Nations University-Maastricht Economic and Social Research Institute on Innovation and Technology (UNU-MERIT). https://www.merit.unu.edu/archive/docs/hl/201302_Capacity%20Building%20for%20 Agricultural%20Research%20Development_Final.pdf .
- Mittal N, Sulaiman RV and Prasad R M (2016) Assessing Capacity Needs of Extension and Advisory Services a Guide for Facilitators. Agricultural Extension in South Asia. http:// www.aesanetwork.org/assessing-capacity-needs-of-extension-and-advisory-services-aguide-for-facilitators.
- Mishra DC (1990) New Directions in Extension Training. Directorate of Extension, Ministry of Agriculture, Govt. of India, New Delhi.
- Pretty JN, Gujit I, Thompson J, and Scoones I. (1995) A Trainer's Guide for Participatory Learning and Action. IEED Participatory Methodology Series.


**Course outcomes:**

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.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-III**

**EXT-532 Managing Extension Organizations**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 50**

**Practical: 25**

**Internal assessment: 25**

**Credit hours: 3(2+1)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 10 marks (Comprising of 10 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All question will carry equal marks (10).

**Course objectives:** 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.

**Course contents:**

**Theory**

**Section- A:** 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. Extension management (POSDCORB) in 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.

**Section-B:** 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.).

**Section-C:** 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.

**Section-D:** 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. 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.

**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 agroenterprises**.** Developing model agriculture-based projects including feasibility study, financial**.** planning and cost-benefit analysis.

**Suggested readings**


- Koontz H and Weihrich H (2015) *Essentials of Management: An International, Innovation and Leadership perspective.* McGraw Hill Education (India) Private Ltd.
- MANAGE (2008) *Project Management in Agricultural Extension*, AEM-203, Post Graduate
- Diploma in Agricultural Extension Management (PGDAEM), National Institute of
- Agricultural Extension Management, Hyderabad http://www.manage.gov.in/pgdaem/ studymaterial/aem203.pdf
- Van den Ban AW and Hawkins HS (1998) *Agricultural extension- Chapter 10,* BSL, CBS Publishers and Distributors.


**Course outcomes:**

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.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-III**

**STAT 522 Data Analysis Using Statistical Packages**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 50**
**Practical: 25**
**Internal assessment: 25**
**Credit hours: 3(2+1)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 10 marks (Comprising of 10 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All question will carry equal marks (10).

**Course objectives:** This course is meant for exposing the students in the usage of various statistical packages for analysis of data. It would provide the students hands on experience in the analysis of their research data. This course is useful to all disciplines.

**Course contents: Theory**

**Section-A:** Introduction to various statistical packages: Excel, R, SAS, SPSS. Data Preparation; Descriptive statistics; Graphical representation of data, Exploratory data analysis.Test for normality; Testing of hypothesis using chi-square, *t* and *F* statistics andZ-test.

**Section-B**: Data preparation for ANOVA and ANCOVA, Factorial Experiments, contrast analysis, multiple comparisons, Analyzing crossed and nested classified designs.

**Section-C:** Analysis of mixed models; Estimation of variance components; Correlation and regression analysis, Probit, Logit and Tobit Models.

**Section-A**: Discriminant function; Factor analysis; Principal component analysis; Analysis of time series data, Fitting of non-linear models; Neural networks.

**Practical:** Use of software packages for summarization and tabulation of data, obtaining descriptive statistics, graphical representation of data; Testing the hypothesis for one sample *t*-test, two sample *t*-test, paired *t*-test, test for large samples - Chi-squares test, F test, one-way analysis of variance; Designs for Factorial Experiments, fixed effect models, random effect models, mixed effect models, estimation of variance components; Linear regression, Multiple regression, Regression plots; Discriminant analysis- fitting of discriminant functions, identification of important variables; Factor analysis. Principal component analysis - obtaining principal component.

**Suggested reading:**


- Anderson C.W. and Loynes R.M. 1987. The Teaching of Practical Statistics. John Wiley.
- Atkinson A.C. 1985. Plots Transformations and Regression. Oxford University Press
- Chambers J.M., Cleveland W.S., Kleiner B and Tukey P.A. 1983. Graphical Methods for Data Analysis. Wadsworth, Belmount, California.
- Chatfield C. 1983. Statistics for Technology. 3rd Ed. Chapman & Hall. Chatfield C. 1995. Problem Solving: A Statistician's Guide. Chapman & Hall.


**Course outcomes:**

After the completion of the course students will be expected to:

- Familiar with various types of statistical packages used for analysis of data.
- Apply the statistical applications during the data analysis.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-III**

**EXT-591 CREDIT SEMINAR**

**Maximum marks: 100**
**Theory: 100**
**Credit hours: 1(1+0)**

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-III**

***PGS-531 Intellectual Property & its management in Agriculture**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 100**

**Credit hours: 1 (1+0)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. There will be total of five questions, out of which first question of 20 marks (Comprising of 10 short answer type questions of 2 mark each) covering the whole syllabus will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All question will carry equal marks (20).

**Course 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 knowledgebased economy.

**Course contents: Theory:**

**Section A:**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;

**Section B:**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;

**Section C:**Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection; National Biodiversity protection initiatives; Convention on Biological Diversity;

**Section D:** International Treaty on Plant Genetic Resources for Food and Agriculture; Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement.

**Suggested reading:**


- Erbisch FH and Maredia K.1998. Intellectual Property Rights in Agricultural Biotechnology. CABI.
- Ganguli P. 2001. Intellectual Property Rights: Unleashing Knowledge Economy. McGraw-Hill.
- Intellectual Property Rights: Key to New Wealth Generation. 2001. NRDC and Aesthetic Technologies.
- Ministry of Agriculture, Government of India. 2004. State of Indian Farmer. Vol. V. Technology Generation and IPR Issues. Academic Foundation.
- Rothschild M and Scott N. (Ed.). 2003. Intellectual Property Rights in Animal Breeding and Genetics. CABI.
- Saha R. (Ed.). 2006. Intellectual Property Rights in NAM and Other Developing Countries: A Compendium on Law and Policies. Daya Publ. House.


**Course outcomes:**

After the successful completion of this course students will be able to:

- Use different tools of IPR for their rights.
- They will be able to guide the innovative farmers regarding various IPR tools and their use for protection of their rights.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-III**

***EXT-599 *Masters' Research**

**S/US**

**Credits hours: 10(0+10)**

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-IV**

**EXT-541 Evaluation and Impact Assessment**

**Time: 3 Hours** **Maximum marks: 100**

**Theory: 50**

**Practical: 25**

**Internal assessment: 25**

**Credit hours: 3(2+1)**

**Instructions for the Paper Setters:**

1. Question paper should be set strictly according to the syllabus.
2. The language of questions should be straight & simple.
3. In all nine questions should be asked, of which first question of 10 marks (Comprising of 10 short answer type questions covering the whole syllabus) will be compulsory.
4. Out of remaining eight questions, two questions should be asked from each section, out of which the candidates are required to attempt one question from each section. All question will carry equal marks (10).

**Course Objectives:** objective of this course is 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.

**Course contents:**

**Theory**

**Section-A-** 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. 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. Competency and credibility of evaluator.

**Section-B- Ten Steps in programme evaluation:** (1) Identify and describe programme you want to evaluate (2) Identify the phase of the programme(design, start-up, ongoing, 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. 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.

**Section-C-** 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. 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 (To), Pessimistic time (Po), Most likely time (TM), Expected time (TE), 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. 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. 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.

**Section-D-** 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. 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. 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. 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?

**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 objective 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 indicator 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.

**Suggested Reading**


- Adrienne M, Gundel S, Apenteng E and Pound B. 2011. *Review of Literature on Evaluation Methods Relevant to Extension.* Lindau, Switzerland: Global Forum for Rural Advisory Services, Lindau, Switzerland.
- Bennett CF. 1979. *Analyzing impacts of extension programs*. Washington, D.C., USA: U.S. Department of Agriculture
- Dale R. 2004. *Evaluating Development Programmes and Projects*, New Delhi, India: Sage Publications.
- Rossi PH and Freeman HE. 1985. *Evaluation: a systematic approach (third edition).* Beverly Hills, CA Sage Publications, Inc.
- Wholey JS, Harty HP and Newcomer KE. 1994. *Handbook of practical program evaluation.* San Francisco, USA: Jossey-Bass Publisher.


**Course 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.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-IV**

***PGS-541 Basic Concepts in Laboratory Techniques**

**Time: 3 Hours** **Maximum marks: 100**
**Practical: 100**
**Credit hours: 1(0+1)**

**Instructions for the Paper Setters:**

1. The question paper will consist of nine skill-oriented questions.
2. The first 5 questions carry 8 marks each. There will be internal choice wherever possible. The answer should be in 50-80 words. (5×8=40 Marks)
3. There will be four essay type questions from the entire syllabus. There will be internal choice wherever possible. The answer should be in 250 words. (4×15= 60 Marks)

**Course Objectives:** To acquaint the students about the basics of commonly used techniques in laboratory. It will also help the students to safely use the Laboratory tools and equipments which will avoid various laboratory accidents.

**Course contents:**

**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, visco meter thermo meter,magneticstirrer,microvens,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.

**Suggested Reading:**


- Furr AK. 2000. CRC Hand Book of Laboratory Safety. CRC Press.
- Gabb MH and Latchem WE. 1968. A Handbook of Laboratory Solutions. Chemical Publ. Co.


**Course outcomes:**

After completion of this course students are expected to:

- Handling the laboratory chemicals and equipments safely.
- Use the laboratory resources precisely.
- Can guide farmers regarding preparation of doses of various agro chemicals in the field.

**M.Sc. Ag. (Agricultural Extension and Communication)**

**SEMESTER-IV**

***EXT-599** ***Masters' Research**

**S/US**

**Credits hours: 10 (0+10)**