

**POST GRADUATE DEPARTMENT OF AGRICULTURE
SYLLABUS FOR THE BATCH FROM THE YEAR 2022 TO
YEAR 2024**

Programme Code: MEXT

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

**(Semester- III- IV)
Examinations: 2023-24**



Khalsa College, Amritsar

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(b) Subject to change in the syllabi at any time.
(c) Please visit the University website time to time**

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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.

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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 manage new entrepreneurial ventures successfully.

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SEMESTER-I

Course Codes	Subjects	Credit hours	Marks	TOTAL MARKS	Page- No.
			Theory+ Practical+ I. Assessment		
EXT-511	Development perspectives of Extension Education	3 (2+1)	50+25+25	100	8-9
EXT-512	Development Communication and Information Management	3 (2+1)	50+25+25	100	10-11
STA-513	Designs of Surveys	3 (2+1)	50+25+25	100	12-13
STA-414	Statistical Methods for Research Workers	3 (2+1)	50+25+25	100	14-15
*PGS-501	Technical Writing & Communication Skills	1 (1+0)	100 (Th)	100	16-17
*PGS-502	Library and Information Services	1(0+1)	100 (Pr)	100	18
*EXT-600	Masters' Research	4(0+4)	-	S/US	19
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) (2022-24)**SEMESTER-II**

Course Codes	Subjects	Credit hours	Max. Marks Theory+ Practical+ I. Assessment	TOTAL MARKS	Page No.
EXT-521	Human Resource Development	3 (2+1)	50+25+25	100	20-21
EXT-522	Entrepreneurship development and management in extension	3 (2+1)	50+25+25	100	22-23
AGE-523	Research Methodology for Social Sciences.	3 (2+1)	50+25+25	100	24-25
AGR-521	Principles and Practices of Weed Management	3 (2+1)	50+25+25	100	26-27
*PGS-503	Agricultural Research and Publication Ethics	1 (1+0)	100 (Th)	100	27-28
*EXT-600	Masters' Research	4(0+4)	-	S/US	30
TOTAL		17(12+5*)			

*** Non Credit Course**

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

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SEMESTER-III

Course Code	Subject	Credit Hours	Max. Marks Th+Prac+A	TOTAL MARKS	Page No.
EXT-531	Perspectives of Distance Education	3 (3+0)	75+0+25	100	31
EXT-532	Market-Led-Extension	3 (3+0)	75+0+25	100	32
AGR-532 Minor	Principles and practices of organic farming	3 (2+1)	50+25+25	100	33-34
*PGS-504	Intellectual Property & its Management in Agriculture	1 (1+0)		S/US	35-36
EXT-591	Credit seminar	1 (0+1)	-	100	37
*EXT-600	Master's Research	6 (0+6)	-	S/US	38
TOTAL		17(10+7*)			

*** Non Credited.**

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

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SEMESTER-IV

Course Code	Subject	Credit Hours	Max. Marks Th+Prac+A	TOTAL MARKS	Page No.
EXT-541	Diffusion and adoption of innovations	3 (3+0)	75+0+25	100	39-40
EXT-542	Participatory Programme Management	3 (2+1)	50+25+25	100	41
*PGS-505	Disaster Management	1 (1+0)	100 (Th)	S/US	42-43
*EXT-600	Master's Research	6 (0+6)	-	S/US	44
TOTAL		13(6+7*)			

*** Non Credited.**

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

SEMESTER-I

EXT-511: Development Perspectives of Extension Education

Time: 3 Hours

Max. 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. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (10).

Course objectives: Main objectives of the course is to generate awareness about the various perspectives of extension education which can be used for the development purpose. It also aims to impart the knowledge about role of various agencies in development of people.

Course contents:

Theory

Section-A: Objectives, principles and philosophy of extension education. Adult education and distance education.

Section-B: Pioneering extension efforts and their implications in Indian agricultural extension system. Analysis of extension systems of ICAR, SAU, State departments and non-government organizations

Section-C: Poverty alleviation, employment generation and women development programmes. Problems in rural development. Decentralised decision making, bottom-up planning.

Section-D: Farming system approach. Farming situation based extension. Market led extension. Farm field school. Agricultural Technology Information Centre. Kisan Call Centres, National Agricultural Innovation Project.

Practical:

Studying on-going rural development programmes. Visits to KVK, NGO and extension centers of State Agricultural University and state development departments to study their objectives, organizational set up and activities. Report preparation and presentation.

- **Suggested readings**
- Dubey V.K.& Bishnoi Indra 2008, Extension Education and Communication, New sage international publishers.
- Ganesan R, Iqbal IM & Anandaraja N. 2003. Reaching the Unreached: Basics of Extension Education. Associated Publishing Co.
- Khan PM. 2002. Textbook of Extension Education. Himalaya Publications.

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- Ray GL. 2006. Extension Communication and Management. Kalyani Publications.
- Supe S.V. 2009 A textbook of Extension Education. Agrotech publishing company, Udaipur.
- Van Den Ban AW & Hawkins HS. 1998. Agricultural Extension .2nd Ed. CBS.

Course outcomes

- Get knowledge about the importance of extension education in agriculture development.
- Know about various rural development programmes aimed at poverty alleviation.
- Know about new innovations being brought in the field of agriculture extension.

SEMESTER-I

EXT-512: Development Communication and Information Management

Time: 3 Hours

Max. 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. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (15).

Course objectives: Main objective of the course is to make the students understand about communication process, so that they can use it for communicating with the farmers and to make the students capable of selecting the appropriate method of communication.

Course contents:

Theory

Section-A: Communication-concept, meaning, importance, models, theories and types. Communication delity, credibility, empathy, feedback and factors affecting communication process. Communication skills. Characteristics and role of key communicators in development.

Section-B: Expert system in selected enterprises. Role of ICT in communication. Social networks and development. Effective oral communication, public speaking, non-verbal communication, writing skills and soft skills.

Section-C: Participative communication meaning, importance, process and determinants. Development communication-concept, nature and significance.

Section-D: Recent advances in communication- print and electronic, internet, e-mail, fax, mobile, interactive video and teleconferencing, computer and computer networking (PAN, LAN, CAN, MAN, WAN), AGRINET, e- Governance.

Practical:

Exercises in oral and written communication. Planning and use of different communication approaches. Practical hands on experience in recent advances in print and electronic media.

Suggested Readings

- Dahama OP & Bhatnagar OP. 2005. Education and Communication for Development. Oxford & IBH. Grover I, Kaushik S, Yadav L & Varma SK. 2002. Communication and Instructional Technology. Agrotech Publ. Academy. .

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- Sandhu AS. 2004. Textbook on Agricultural Communication Process and Methods. Oxford & IBH. Basavaprabhu Jirli, Dipak De, G.C.KEndadamath 2005. Information and Communication technology, Ganga Kaveri publishing House Varanasi
- Shirley A. White *et al* 1994, Participatory Communication, Sage Publications, New Delhi.

Course outcomes:

The students will be able to:

- Understand the concepts, meaning and process of communication
- Learn about the modern media of communication
- Identify the information management methods of journalistic writing of various information materials.

SEMESTER-I

STAT-513:

Designs of Surveys

Time: 3 Hours

Max. 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. 4. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (15).

Course objectives: To familiarize with basic elementary concept of sampling. To understand the different forms of sampling techniques involved for analysis. To explore the different methods for calculation of various type of sampling

Course contents:

Theory

SECTION-A: Importance of sample surveys, Census and Sample Survey, Principal steps in a Sample Survey, Prerequisites in planning a Sample Survey, Designing of a survey, Preparation of questionnaire, Sampling and Non- Sampling errors.

SECTION-B: Probability and Non-Probability Sampling, Sampling from finite population: simple random sampling with (SRSWR) and without replacement (SRSWOR); Determination of sample size. Probability proportional to size sampling, Stratified sampling: cumulative cube root method.

SECTION-C: Systematic sampling; Linear systematic sampling, Circular systematic sampling, Cluster sampling; estimation of mean/ total using simple random sampling, Multistage sampling; estimation of mean/total PPSWR and SRSWOR.

SECTION-D Ratio, product and regression method of estimation; Double sampling. Successive sampling, Randomized response technique.

Practical:

Sample selection in various sampling schemes. Estimation of parameters in simple random sampling. Probability proportional to size sampling. Stratified sampling. Systematic sampling. Cumulative cube root method. Multistage sampling. Ratio, product and regression method of estimation. Double Sampling.

Suggested Reading:

- Ravindra Singh and Naurang Singh Mangat, Elements of Survey Sampling, Springer-Science+ Business Media, B.V.

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- V. G. Panse and P. V. Sukhatme: Statistical Methods for Agricultural Workers Published by: The Indian Council of Agricultural Research, New Delhi, India.
- Daroga Singh & F.S. Chaudary, Theory and Analysis of Sample Survey Designs, New age publishers.

Course Outcome :

- It enables students to get acquainted with different types of sampling techniques
- It helps students to understand the various method for estimation of sampling
- It also helps the students in research work about choice of sampling

SEMESTER-I

STA-414: Statistical Methods for Research Workers

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. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (15).

Course Objectives: The aim of this course is to understand the basics of statistical methods and their applications in agriculture. It helps the students in understanding, analyzing and interpreting the agricultural data. It also helps in making appropriate decisions in agricultural research findings.

Course contents:

Theory

Section-A: Probability and fitting of standard frequency distribution, sampling techniques, sampling distributions, mean and standard error.

Section-B: Simple partial, multiple and intra- class correlation and multiple regression.

Section-C: Tests of significance, students'-t, chi-square and large sample tests, confidence intervals.

Section-D: Analysis of variance for one way and two way classification with equal cell frequencies, transformation of data.

Practical: Fitting of distributions, samples and sampling distributions, correlation and regression, tests of significance and analysis of variance.

Note: Students shall be trained to use computer to analysis the data, using available softwares. However, during university examination students will use scientific calculators to analyse the data.

Suggested Reading

- Gupta, S.C., Fundamentals of Statistics, 7th Edition, Himalaya Publishing House.
- Gupta, S.C., Kapoor V.K., Fundamentals of Applied Statistics, 4th Edition, Sultan Chand & Sons.
- R. Rangaswamy, A Textbook of Agricultural Statistics, 3rd Edition, New Age International Publishers.

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Course Outcomes :

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

SEMESTER-I

***PGS 501**

Technical Writing & Communication Skills

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 the question should be straight and simple.
3. The question paper will consist of nine skill-oriented questions.
4. The first five questions carry eight marks each. There will be internal choice wherever possible. The answer should be in 50-80 words. (5*8=40)
5. There will be four essay type questions from entire syllabus. There will be internal choice wherever possible. The answer should be in two fifty words. (4*15=60)

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:

Theory:

Technical Writing- Various forms of technical writing-theses, technical papers, reviews, electronics communication etc: qualities of technical writing: parts of research communication- title page, content page, authorship, preface, introduction, review of literature, materials and methods, experimental results, documentation; photographs and drawings with suitable captions; pagination; citation; writing of abstracts; précis; synopsis; editing and proof reading. Communication Skills-defining communication; types of communication- verbal and non-verbal; assertive communication; assertive communication: using language for effective communication; techniques of dyadic communication- message pacing and message chunking, self disclosure mirroring, expressing conversation intent; paraphrasing; vocabulary building- word roots, prefixes, Greek and Latin roots.

Suggested Reading:

- Barnes and Noble. Robert C. (Ed.). 2005. Spoken English: Flourish Your Language.
- Chicago Manual of Style. 14th Ed. 1996. Prentice Hall of India.
- Collins' Co build English Dictionary. 1995.
- Harper Collins. Gordon HM and Walter JA. 1970. Technical Writing. 3rd Ed.
- Holt, Rinehart and Winston. Hornby AS. 2000. Comp. Oxford Advanced Learner's Dictionary of Current English. 6th Ed. Oxford University Press.
- James HS. 1994. Handbook for Technical Writing. NTC Business Books.
- Joseph G. 2000. MLA Handbook for Writers of Research Papers. 5th Ed. Affiliated.

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Course outcomes:

On completing the course, the students will be able to:

- Understand the basic components of definitions, descriptions, process explanations and other common forms of technical writing.
- 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.

SEMESTER-I

***PGS 502**

Library and Information Services

Time:-3 hours

Maximum Marks: 100

Practical : 100

Credit hours: 1 (0+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.

PRACTICAL

Introduction to Library and its services: Five laws of library science: type of documents; classification and cataloguing; organization of documents; sources of information-primary, secondary and tertiary; current awareness and SDI services; tracing information from references sources; library survey; preparation of bibliography; use of Online Public Access Catalogue; use of CD-Rom databases and other computerized library services, CeRA, J-Gate; use of Internet including search engines and its resources, e-resources and 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.

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SEMESTER-I

RESEARCH WORK

S/US

Credit hours per week: 4

(0+4)

Semester-II

EXT-521: Human Resource Development (HRD)

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. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (15).

Course objectives: the main objectives of the course is to make the students understand about various training methods used for empowering of the staff and to make the students capable of taking decisions in various fields of their work.

Course contents:

Section A:

Importance and scope of human resource development (HRD). Inter disciplinary approach, functions, systems and case studies in HRD. Different experiences of HRD interventions. Social and organizational culture. Organizational and managerial values and ethics.

Section B:

Motivation and productivity. Collective bargaining and negotiation skills for human resource management. Information management and measurement. Inter and intra personal processes. Stress and coping mechanisms. Organizational communication. Team building process.

Section C:

Human resource development and supervision. Tasks and responsibilities of a professional manager. Skills required for extension workers. Decision making, management by objectives, behavioural dynamics, leadership styles, group dynamics.

Section D:

Types, models, methods and evaluation of training. Determining training needs and development strategies. Facilities for trainers training and techniques for trainees participation. Research studies in training extension personnel. Main issues and emerging trends in human resource development, culture and climate.

Practical:

Visits to different training organizations to review their on going activities and facilities. Analysis of training methods used for imparting training to farmers and extension personnel. Evaluation of a training programme. Studying human resource development in an organization in

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terms of performance, organizational development, employee's welfare and improving quality of work life and human resource information.

Suggested Readings

- Agochiya D. 2002. Every Trainer's Handbook. Sage Publ.
- David Gross. 1997. Human Resource Management - The Basics. TR Publ.
- Hersey Paul & Balanchard H Kenneth. 1992. Management of Organizational Behaviour Utilizing Human Resource. 5th Ed. Prentice-Hall of India.
- Knoontz Harold & Weihhrich Heinz 1990. Essentials of Management. 5th Ed. McGraw-Hill.
- Lynton RP & Pareek U. 1993. Training for Development. DB. Taraporewale Sons & co.

COURSE OUTCOMES:

On completion of the course students will be able to:

- Get orientation about the need of human resource development
- Understand staff selection and development training methods
- Know various skills like decision making skills , interpersonal skills and leadership skills etc.

SEMESTER-II

EXT-522: Entrepreneurship Development and Management 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. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (15).

Course Objectives: this course aims to impart the knowledge to students about various enterprises which can be developed in agriculture and to acknowledge the students with various methods of management techniques in extension.

Course contents:

Theory

Section A: Agri-entrepreneurship. Traits and types of entrepreneurs. Establishing an enterprise, project management and appraisal. Profitable micro agri-enterprises in India. Agro processing, Khadi and Village Industries Commission. Sources of micro finance. Marketing for enterprises. Gender issues in entrepreneurship development.

Section B: Nature, importance, approaches and levels of management. Extension management. Making planning effective. Decision-making process. Principles and elements of an organization. Interpersonal relations in the organization.

Section C: Training and development. Methods of performance appraisal. Functions and approaches to leadership. Leadership styles. Organizational communication. Work motivation and performance. Approaches to motivation.

Section D: Qualities, functions and essentials of effective supervision. Nature, process, types and techniques of managerial control, budgeting, observation, PERT, CPM and MIS.

Practical: Field visits to successful enterprises, financial institutions and extension organizations. Studying characteristics of successful entrepreneurs. Development of project proposal. Case studies of successful/failed enterprises. Exercises on market survey. Simulated exercises to understand management process. Techniques of decision making and designing organizational structure. Group activity on leadership development skills. Development of short and long term plans.

Suggested Readings

- Chole RR. *et al.* Entrepreneurship development and communication skills. Scientific publishers, New Delhi.

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- Indu Grover. 2008. Handbook on Empowerment and Entrepreneurship. Agrotech Public Academy.
- Khanka SS. 1999. Entrepreneurial Development. S. Chand & Co.
- Viramgami, H.S. 2007 Fundamentals of Entrepreneurship (Entrepreneur and Entrepreneurship) A.P.H. publishing corporation, Darya Ganj, New Delhi.

COURSE OUTCOMES:

On successful completion of the course students will be able to:

- Understand about the planning and development of enterprises for extending the scope of sustainable livelihood for rural people.
- Get knowledge and skills about different management techniques in extension organizations.
- Use supervision techniques and take effective decisions.

SEMESTER-II

AGE-523: Research Methodology for Social Sciences
(Common with M.Sc. Ag. Agricultural Economics Sem-II)

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. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (15).

Course Objectives- Provides an introduction to research methodologies, both qualitative and quantitative. The subject introduces students to contemporary perspectives in educational research, and in particular focuses on developing a range of skills involved in formulating a research proposal; including framing research questions, reviewing the literature and choosing appropriate methodologies for different types of study.

Course contents:

Theory:

Section-A: Importance and scope of research in social sciences. Concept and characteristics of social research. Types of research. Fundamental vs. Applied. Concept of researchable problem – research prioritization, research process.

Section-B: Hypothesis – meaning, characteristics, types and testing. Review of literature. Development of theoretical orientation of the research problem. Concept, construct, variables and their measurement.

Section-C: Sampling design, sampling error and methods of sampling. Research design and techniques. Types of data collection tools and testing their reliability and validity. Scaling techniques. Coding, editing, tabulation and validation of data.

Section-D: Tools of data analysis. Statistical package for social sciences, interpretation of results, preparing research report / thesis. Writing of articles. Universal procedures for preparation of bibliography.

Practical: Selection and formulation of research problem, objectives and hypothesis. Selection of variables and their operationalization. Developing conceptual framework of research. Development of data collection tools and measuring their validity and reliability. Data

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processing, tabulation and analysis. Formulation of secondary tables. Writing of thesis and research articles. Presentation of reports.

Suggested readings-

- Basics of Research Methodology 2015 Edition by A P Kulkarni, Paras Medical Book
- Research Methodology Methods Tools And Techniques by Shashi K. Gupta , PraneetRangi
- Research Methodology by T Bhaskar Rao.

Course outcomes:

On completing the course, the students will be able to:

- Get introduced to research methodologies, both qualitative and quantitative
- Study about contemporary perspectives in educational research with special focus on developing a range of skills involved in formulating a research proposal including framing research questionnaire, reviewing the literature and choosing appropriate methodologies for different types of research study.

SEMESTER-II

AGR-521: Principles and Practices of Weed Management

Time: 3 Hours

Maximum Marks: 100

Theory: 50

Practical: 25

Internal assessment: 25

Credit hours: 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. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (10).

Course objectives: To understand importance of weed biology and weed ecology in weed management. Classification of weeds, different methods of weed control and weed indices. Classification of herbicide, formulations, mixtures, resistance and its management. To understand concept of Integrated weed management bio-herbicides, mycoherbicides and allelopathy in weed management. Weed management in different crops and their economic study.

Course contents:

Theory:

Section-A: Weed biology and ecology, crop-weed competition including allelopathy; principles and methods of weed control and classification; weed indices.

Section-B: Herbicides introduction and history of their development; classification based on chemical, physiological application and selectivity; mode and mechanism of action of herbicides.

Section-C: Herbicide structure activity relationship; factors affecting the efficiency of herbicides; herbicide formulations, herbicide mixtures; herbicide resistance and management; weed control through bio-herbicides, mycoherbicides and allelochemicals; Degradation of herbicides in soil and plants; herbicide resistance in weeds and crops; herbicide rotation.

Section-D: Weed management in major crops and cropping systems; parasitic weeds; weed shifts in cropping systems; aquatic and perennial weed control. Integrated weed management; cost: benefit analysis of weed management.

Practical: Identification of important weeds of different crops; preparation of a weed herbarium; weed survey in crops and cropping systems; crop-weed competition studies; preparation of spray solutions of herbicides of high and low-volume sprayers; use of various types of spray pumps and nozzles and calculation of swath width; economics of weed control; herbicide residue analysis in plant and soil; bioassay of herbicide residue; calculation of herbicidal requirement.

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Suggested books

- Weed Science of Management: Published by- Indian Society of Agronomy
- Weed Management: US Walia (Kalyani Publishers)
- Weed Management: OP Gupta (Published by- Agrobios, India)
- Principles of Crop Production: SR Reddy (Kalyani Publishers)

Course outcomes:

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

- Understand the knowledge on weed biology and weed ecology.
- Chemical weed control in different crops.
- knowledge on herbicide application techniques
- To understand concept of Integrated weed management bio-herbicides, mycoherbicides and allelopathy in weed management
- To formulate integrated weed management practices for different cropping system

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SEMESTER-II

*PGS-503 – Agricultural Research and Publication Ethics

Time: 3.00hrs.

Max. Marks: 100

Theory: 100

Credits hours per week: 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. In all nine questions should be asked, of which first question of 20 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 (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-I: Introduction to philosophy: definition, nature and scope, concept, branches. Ethics: definition, moral philosophy, nature of moral judgments and reactions.

Section-II: Publication ethics: definition, introduction and importance. Best practices/standards setting initiative and guidelines: COPE, WAME, etc. Conflicts of interest. Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, type.

SECTION-III : Violation of publication ethics, authorship and contributor ship. Identification of publication misconduct, complaints and appeals. Predatory publishers and journals. Ethics with respect to science and research; Intellectual honesty and research integrity;

SECTION-IV: Scientific misconduct: Falsification, Fabrication, and Plagiarism (FFP); Redundant publication: duplicate and overlapping publication, salami slicing; selective reporting and misrepresentation of data.

Suggested Readings

- Bird, A (2006) *Philosophy of science*, Routledge.
- MacIntyre, A (1967) *A short history of ethics*, London.
- Chaddah, P (2018) *Ethics in competitive research : Do not get scooped; Do not get plagiarized*. Self Published.
- Sharma, Yogita And Sharma, Aarti (2021). *Research and Publication Ethics. Theory and Practice*. Kalyani Publications.

Course outcomes: After successful completion of this course students are expected:

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- 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 acquainted with the various rural development programmes and the problems being faced in the implementation of the policies designed for rural development.

SEMESTER-II

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RESEARCH WORK

S/US

Credit hours per week: 4 (0+4)

SEMESTER-III

EXT-531

Perspectives of Distance Education

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. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (15).

Course objectives:

The main objectives of this course is to impart the knowledge to students about working of various modes and methods of distance education and to generate awareness about various technologies used for distance education.

Course contents:

Theory

Section A: Concept, evolution, philosophy, work ethics and characteristics of distance education. Theory, methodology, epistemology, dimensions, scope and problems of distance education.

Section B: Scope of non-formal, continuing and correspondence education. Forms and systems of distance and open education. Methods and modes of teaching and learning in distance education.

Section C: Systems approach, course planning, target groups and barriers to learning in distance education. Planning and management of network learning.

Section D: Application of information and educational technologies in distance education. Development of course, course material and management of resources. Video classroom strategy in distance education. Strategies for maximizing services to students and programme evaluation.

Suggested Readings

- Holmberg B. 1995. Theory and Practice of Distance Education. Routledge Publ..
- Lakshmi Reddy MV. 2001. Towards Better Practices in Distance Education. Kanishka Publ.
- More MG. 2003. Hand Book of Distance Education. Lawrence Erlbaum Associates Publ.

Course outcomes:

On completing the course, the students will be able to:

- Understand the concept of distance education and characteristics of distance education.
- Know various technologies used for distance education and different strategies for maximizing its reach and programme evaluation.

SEMESTER-III

EXT-532: Market Led Extension

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. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (15).

Course objectives: This course aims at describing the various new perspectives, challenges and dimensions of market-led extension and to generate awareness about agricultural marketing, consumer behavior and marketing research process.

Course contents:

Theory

Section-A: Present scenario of agricultural extension at the national level. Emerging perspectives, challenges and dimensions of market led extension.

Section-B: An overview of agricultural marketing.Consumer behaviour, marketing communication and promotional strategies.Marketing research process.

Section-C: Agricultural trade liberalization and its impact. International marketing opportunities.Implications of Agreement on Agriculture, TRIPS and Intellectual Property Rights.

Section-D: Role of self-help groups and public private linkages in market led extension. Information technology enabled approaches for market led extension and communication.

Suggested Readings

- Kaleel FMH &Krisnamurthy J. 2007. Market Led Extension Dimensions and Tools. Agro Tech Publ. Academy.
- Rajmanohar TP &Kumaravel KS. 2006. Contract Farming in India. ICFAI Univ. Press, Hyderabad. Subbalakshmi V. 2005. Globalization - Indian Experience. ICFAI Univ. Press, Hyderabad. Suresh K. 2005. Rural Markets - Emerging Opportunities. ICFAI Univ. Press, Hyderabad.

Course outcomes:

- On successful completion of this course students will be able to:
- Learn the significance of post-harvest management and value addition in present market environment, challenges and future strategy for market led extension management
- Identify the information sources and develop strategy for market intelligence and the marketing infrastructure
- Learn the public-private partnership for market led extension management, contract farming; WTO, its implications on agriculture

SEMESTER-III

AGR-532 Principles and Practices of Organic Farming

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).

Theory:

Section-A: Organic farming - concept and definition, its relevance to India and global agriculture and future prospects;

Section-B: land and water management - land use, minimum tillage; shelter zones, hedges, pasture management, agro forestry. Organic farming and water use efficiency; soil fertility, nutrient recycling, organic residues, organic manures, composting, soil biota and decomposition of organic residues, earthworms and vermicompost, green manures and biofertilizers.

Section-C: Farming systems, crop rotations, multiple and relay cropping systems, intercropping in relation to maintenance of soil productivity. Control of weeds, diseases and insect pest management, biological agents and pheromones, biopesticides.

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

Practical:

Aerobic and anaerobic methods of making compost; making of vermicompost; identification and nursery raising of important agro forestry trees and trees for shelter belts; efficient use of biofertilizers, technique of treating legume seeds with rhizobium cultures, use of azotobacter, azospirillum, and PSB cultures in field; visit to an organic farm; quality standards, inspection, certification and labeling and accreditation procedures for farm produce from organic farms.

Suggested Reading:

- Ananthkrishnan TN. (Ed.). 1992. Emerging Trends in Biological Control of Phytophagous Insects. Oxford & IBH.
- Gaur AC. 1982. A Manual of Rural Composting, FAO/UNDP Regional Project Document, FAO.

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- Joshi M. 2016. New Vistas of Organic Farming. Scientific Publishers
- Lampin N. 1990. Organic Farming. Press Books, Ipswich, UK.
- Palaniappan SP and Anandurai K. 1999. Organic Farming – Theory and Practice. Scientific Publ.
- Rao BV Venkata. 1995. Small Farmer Focused Integrated Rural Development: Socio-economic Environment and Legal Perspective: Publ.3, ParisaraprajnaParishtana, Bangalore.
- Reddy MV. (Ed.). 1995. Soil Organisms and Litter Decomposition in the Tropics. Oxford & IBH.
- Sharma A. 2002. Hand Book of Organic Farming. Agrobios.
- Singh SP. (Ed.). 1994. Technology for Production of Natural Enemies. PDBC, Bangalore.
- Subba Rao NS. 2002. Soil Microbiology. Oxford & IBH.
- Trivedi RN. 1993. A Text Book of Environmental Sciences, Anmol Publ.
- Veeresh GK, Shivashankar K and Suiglachar MA. 1997. Organic Farming and Sustainable Agriculture. Association for Promotion of Organic Farming, Bangalore.
- WHO. 1990. Public Health Impact of Pesticides Used in Agriculture. WHO.
- Woolmer PL and Swift MJ. 1994. The Biological Management of Tropical Soil Fertility. TSBF & Wiley

SEMESTER-III

***PGS-504 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 Readings:

- Erbisch FH and Maredia K.1998. Intellectual Property Rights in Agricultural Biotechnology. CABI.
- Ganguli P. 2001. Intellectual Property Rights: Unleashing Knowledge Economy. McGraw-Hill.

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- 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.

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SEMESTER-III

CREDIT SEMINAR

EXT-591

Maximum Marks: 100

Credit hours: 1(0+1)

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SEMESTER-III

EXT-600

RESEARCH WORK

S/US

Credit hours per week: 6(0+6)

SEMESTER-IV

EXT-541 Diffusion and adoption of innovations

Time: 3 Hours

Max. 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. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (15).

Course objectives:

Main objectives of the course is to generate awareness about the various perspectives of extension education which can be used for the development purpose. It also aims to impart the knowledge about role of various agencies in development of people.

Theory

Section A:

Concept and elements of diffusion, innovation generation and development process in application of research. Concept and stages of adoption and innovation-decision process.

Section B:

Innovativeness, adopter categories and their characteristics.

Attributes of an innovation and factors influencing the rate of adoption. Concept of over adoption.

Section C:

Role of change agents in diffusion and adoption. Meaning, characteristics and types of opinion leaders.

Multi-step flow of innovation.

Section D:

Concepts of homophily, heterophily and their influence on flow of innovations. Types and consequences of innovation-decisions. Meaning, theories, process, steps and factors influencing decision making.

Suggested Readings

- Rogers E.M. 2003, Diffusion of Innovations (5th edition), Free Press Publisher.
- Zolait A. H. 2013, Technology Diffusion and Adoption- Global Complexity, Global Innovation, Idea group U.S.
- Sharma S.K. 2016, Communication Adoption and Diffusion of Innovation, Rama Publishing House.
- Mondel S. 2018, Communication and Diffusion of Agricultural Innovation, Kalyani Publisher.

Course outcomes:

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

- Know about the process of diffusion of an innovation.

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- Know about various categories of adopter farmers.
- Will acquaint with the process of adoption.

SEMESTER-IV

EXT-542 Participatory Programme Management

Time: 3 Hours

Max. 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. Of the remaining eight questions, two questions should be asked from each section, of which the candidates are required to attempt one question from each section. All questions carry equal marks (10).

Course Objectives: The course aims at accessing needs, goals and resources, planning and organizing programme activity tracking progress and evaluating outcomes.

Section A:

Conceptual framework of extension programme. Planning - key concepts and importance in planned change. Participatory planning - concept, importance, process.

Section B:

Techniques of participatory planning RRA, PRA and PLA and their application in extension. Approaches of participatory planning - cooperative, democratic, bottom up and down.

Section C:

Project management techniques - PERT, CPM, SWOT analysis, obtaining technical and monetary support from GOs and NGOs.

Section D:

Importance and ways of people's participation in programme planning. Concept and formation of farmers and women SHGs. Implementation and evaluation - concept, importance and techniques.

Practical: Application of PRA methods. Critical review of evaluation studies related with farmers, women and rural development programmes. Critical analysis of monitoring and evaluation of developmental programmes. Preparation and implementation of home improvement / agriculture development work plans. Critical evaluation of work plans with specific evaluation techniques. Organizing and evaluating programmes related to farmers, women and children at village level.

Suggested Readings

- Powers, D. R. and Powers, M.S. 2012, Making Participatory Management Work, Whidbey Publishing
- Brown J. T. 2014, The Handbook of Programme Management, McGraw Hill

Course outcomes;

- Students will get aware about the process of planning an extension programme.
- They will understand the whole process of evaluation and types of evaluation.

SEMESTER-IV

***PGS-505**

Disaster Management

Time: 3 Hours

Credit hours: 1(1+0)

Max. 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: Objective of this course is to get the students aware about various kinds of natural disasters, man-made disasters and its its management.

Course contents:

Theory :

Section A: Hazards and Disasters, Risk and Vulnerability in Disasters, Natural and Man-made disasters, earthquakes, floods drought, landside, land subsidence, cyclones, volcanoes, tsunami, avalanches, global climate extremes. Man-made disasters: Terrorism, gas and radiations leaks, toxic waste disposal, oil spills, forest fires.

Section B: Earthquakes and its types, magnitude and intensity, seismic zones of India, major fault systems of India plate, flood types and its management, drought types and its management, landside and its managements case studies of disasters in Sikkim (e.g) Earthquakes, Landside). Social Economics and Environmental impact of disasters.

Section C: Basic principles of disasters management, Disaster Management cycle, Disaster management policy. National and State Bodies for Disaster Management, Early Warning Systems, Building design and construction in highly seismic zones, retrofitting of buildings.

Section D: Training and drills for disaster preparedness, Awareness generation program, Usages of GIS and Remote sensing techniques in disaster management, Mini project on disaster risk assessment and preparedness for disasters with reference to disasters in Sikkim and its surrounding areas.

• Suggested readings:

- Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012)
- Damon, P. Copola, (2006) Introduction to Intemational Disaster Management, ButterworthHeineman.
- Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
- Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New
- Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD

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Course outcomes:

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

- Understand the types of natural and man-made disasters.
- They will know the management techniques in any natural or man-made disaster situation.
- They will also get familiar with various kinds of government policies and programmes for disaster prone and disaster effected places.

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SEMESTER-IV

EXT-600

RESEARCH WORK

S/US

Credit hours per week: 6(0+6)