Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Agriculture
Ph.D. (Ag.) Agricultural Extension Education

Syllabus

A.1.Research Methodology (PHDAS 101)

Course code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Mid Term Exam	Teachers Assessment*	END SEM University Exam	Teacher's Assessment*			
PHDAS 101	Research Methodology	60	-	40	0	0	3	0	3

1. Legends: L - Lecture**; P –** Practical

**2. ***Teacher Assessment shall be based on following components: Quiz / Assignment / Project / Participation in Class.

A1. Research Methodology (PHDAS 101)

Module 1: Introduction to Research Methods: Role and objectives of research, types of research and various research design (exploratory, descriptive, experimental and diagnostic research), research process: Overview, Problems encountered by researcher. Experimental research design will comprise of Completely Randomized Design, Latin Square Design and Factorial Design. Limitations of RM: Ethics in Research, Philosophical issues in Research.

Module 2: Data and their Collection: Collection, Organization, Presentation, Analysis and Interrelation of Primary and Secondary Data. Measurement in research, measurement scales, sources of errors in measurement, Techniques of developing measurement tools, classification and testing (reliability, verification and validity) scales, Designing questionnaires and interviews Sampling , Sampling Methods, Sampling Plans, Sampling Error, Sampling Distributions : Theory and Design of Sample Survey, Census Vs Sample Enumerations, Objectives and Principles of Sampling, Types of Sampling, Sampling and Non-Sampling Errors.

Module 3: Numerical Methods and Statistical Analysis Curve fitting (least square), solution of polynomial equation, numerical integration (Trapezoidal rule, Simpson's rule, Gaussian qudrature), solution of ordinary differential equations (Euler's method, Runge-Kutta method, predictor-corrector method), matrix multiplication, inversion and diagonalisation.

References

- Kumar, R.(2006).**Research Methodology-A Step- By- Step Guide for Beginners**, Delhi: Pearson Education.
- Montgomery, D. C. (2007).**Design & Analysis of Experiments**. India: Wiley.
- Kothari, C. R. (2004). **Research Methodology: Methods and Techniques**. New Delhi: New Age International.

(Prof. Vinod Dhar)	(Dr. K. N. Guruprasad)	(Dr. Shishir Jain)	(Dr. Arvind Singh)
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Review of Literature (PHDA 102)

Course code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Mid Term Exam	Teachers Assessment*	END SEM University Exam	Teacher's Assessment*			
PHDA 102	Review of Literature	0	-	0	60	40	2	0	2

1. Legends: L - Lecture**; P –** Practical
**2. ***Teacher Assessment shall be based on following components: Quiz / Assignment / Project / Participation in Class.

A.2.Review of Literature (PHDA102)

Course Overview: The objective of this course is to help the candidate to comprehend his/her broad field of research and be academically sound to carry out his research work. Understand the basic philosophical assumptions underlying research literature reviews for different purposes, including what, why, when, for whom, and how? Be able to manage the process of conducting a literature review, including reading, note taking strategies, coding/reference management, synthesizing and writing literature results. Be able to write a quality literature review with variations in references

Course Content

Module 1: **Understanding Review of literature:** Relevance, Approach and Applications; Developing an outline for the literature review; Formulate key questions for a review. Organizing a literature search**:** Identify which literature bases to search; Developing the theoretical basis for the Research Question; Searching for, locating and organizing relevant professional literature

Module 2: **Conducting the Review:** Abstract relevant information from appropriate studies in a systematic manner; critically reviewing the literature; Rate the scientific quality of each study and the level of evidence for each question;

Module 3: **Synthesizing the Review:** Create evidence tables and summary tables; interpret the pattern of evidence interms of strength and consistency; Summarize the studies' findings. Writing the review: Writing a first draft; Writing references and citations; Obtaining, giving, and making productive use of feedback; the redrafting process; Professional formatting.

A.3.Computer Applications (PHDA 103)

Course code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Mid Term Exam	Teachers Assessment*	END SEM University Exam	Teacher's Assessment*			
PHDA 103	Computer Applications	0	-	0	60	40	2	0	2

1. Legends: L - Lecture**; P –** Practical

**2. ***Teacher Assessment shall be based on following components: Quiz / Assignment / Project / Participation in Class.

Course Overview: *The candidate should gain sufficient practical knowledge for use of computer and computer software for use in research work.*

Contents

Module 1: Basic knowledge of application software's in MS- Office with focus on MS-Word- its features and applications related to presentation of text in decent format and saving the same for further use. The practical knowledge of this software should enable the candidate to type and prepare the thesis
in a presentable format.MS-Excel- construction of worksheet and inserting data according to its characteristics, use of statistical tools and their presentation in the form of charts and graphs.

Module 2: Use of Internet for research work and exploring various websites and search engines for collecting quality literature review and secondary data etc. related to thesis work.

Module 3: MS- Power point – create power point presentation on a topic related to the theme of thesis and use of different presentation techniques. Use of SPSS – method of preparing data sheet and entering data according to its characteristics , use of various statistical tools on SPSS.

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Research and Publication Ethics (RPE) (PHDA 104)

Course code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Mid Term Exam	Teachers Assessment*	END SEM University Exam	Teacher's Assessment*			
PHDA 104	Research and Publication Ethics	60	-	40	0	0	2	0	2

1. Legends: L - Lecture**; P –** Practical

**2. ***Teacher Assessment shall be based on following components: Quiz / Assignment / Project / Participation in Class.

A.4.Research and Publication Ethics (RPE) (PHDA 104)

Module 1: Philosophy And Ethics-Introduction to philosophy: definition, nature and scope, concept, branches. Ethics: definition, moral philosophy, nature of moral judgments and reactions.
Scientific Conduct- Ethics with respect to science and research. Intellectual honesty and research integrity. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP).Redundant publications: duplicate and overlapping publications, salami slicing. Selective reporting and misrepresentation of data

Module 2: Publication Ethics-Publication ethics: Definition, introduction and importance.
Best practices / standards setting initiatives and guidelines: COPE, WAME, etc. Conflicts of interest. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types. Violation of publication ethics, authorship and contributor ship. Identification of publication misconduct, complaints and appeals. Predatory publishers and journals.
Open Access Publishing- Open access publications and initiatives. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies. Software tool to identify predatory publications developed by SPPU. Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggested, etc.

Module 3: Publication Misconduct, Group Discussions-Subject specific ethical issues, FFP, authorship. Conflicts of interest. Complaints and appeals: examples and fraud from India and abroad. Software tools- Use of plagiarism software like **Tumitin, Urkund And Other Open Source Software Tools. Data Bases And Research Metrics,** Databases- Indexing databases Citation databases: Web of Science, Scopus, etc. Research Metrics- Impact Factor of journal as per Journal Citation Report, SNIP, SIR, IPP, Cite Score. Metrics: h-index, g index, i10 index, altmetrics.

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Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		Theory			Practical		Credits		
		END SEM University Exam	Mid term exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	P	Total
PHDEXT 601	Policy Engagement and Extension	60	0	40	30	20	2	1	3

1. Legends: L - Lecture**; P –** Practical

**2. ***Teacher Assessment shall be based on following components: Quiz / Assignment / Project /Participation in Class.

Aim of the course

• To orient students on the importance of policies in shaping extension's performance
• To discuss ways of generating policy relevant evidence to influence policies
• To develop capacities to engage with policy actors and the policy development process

The course is organized as follows:

No.	Blocks	Units
1.	Why policies matter?	1. Understanding Policy 2. Policy Advocacy and Tools 3. Policy Analysis 4. Policy Development Process
2.	Using evidence to influence Policy change	5. Influencing Policy Change Policy Change Global Experience with Extension Policy

Theory

Unit 1: Understanding Policy Why policies are important for extension? Role in providing structure, ensure funding and framework for providing functions-examples; Policy: definitions and types: Is policy a product or a process or both? Policies and institutions-How these influence defining organisational roles and performance in extension organizations. Role of policies in upscaling knowledge-Role of extension in influencing policies to enable innovation

Unit 2: Policy Advocacy and Tools Definition of advocacy, Approaches to policy advocacy-Advising, Media campaigning, Lobbying, Activism, Information Education Communication (IEC) and Behavior Change Communication (BCC); Advocacy for Rural Advisory Services (RAS); Policy advocacy strategy

Unit 3: Policy Analysis Explain the meaning and use of policy analysis in decision- making; Describe different types of policy analysis- empirical, evaluative or normative policy analysis, retrospective/ prospective policy analysis, predictive/prescriptive/descriptive policy analysis; How to do policy analysis? - understand the process of policy analysis, highlight the different methods and techniques used in policy analysis, doing ethical policy analysis; Tools for policy impact- research tools, context assessment tools, communication tools, policy influence tools

Unit 4: Policy Development Process Policy development process: Who drives policy change?: National Governments, Donors, Civil Society-varied experiences: Understanding the environment and key actors in policy space- problem identification-policy adoption, implementation and evaluation; stakeholder mapping, identifying opportunities and barriers, mobilising financial resources; Dealing with policy incoherence: identifying contradictions and challenges in policy implementation

Unit 5: Influencing Policy Change Generating evidence: Role of policy research; analyzing the usefulness and appropriateness of the evidence; Using evidence in policy advocacy; Understanding your audience: analyzing channels of influence; creating alliances; identifying policy champions; Defining goals and objectives; Developing advocacy messages: Policy papers, Policy briefs, good practice notes, etc.: Good practices in influencing policies Organising policy dialogues: Policy engagement strategy-Engaging with policy makers: GO and NGO experiences; Policy working groups; advisory panels; use of committees: Use of media including ICTs and social media for influencing policies. Global Experience with Extension Policy Extension policy in different countries: Explicit extension policy Vs extension as part of Agriculture Policy, Challenges in policy implementation: lack of capacities, financial resources, ownership, lack of stakeholder consultations: Strengthening capacities in extension to influence policies: Global Forum for Rural Advisory Services (GFRAS)'s efforts in strengthening extension policy advocacy: policy compendium, training modules, training for strengthening capacities to influence policies.

Practicals

• Analysis of country/state level agricultural/extension policy to understand the policy intentions from strengthening EAS

• Analysis of extension policy of other countries: policy intentions, processes adopted in development of the policy and mechanisms of policy implementation

• Interview key policy actors in EAS arena at the state/national level (eg: Director of Agriculture, Director of Extension in SAU, Chairman/Managing Director of Commodity Board. Member Agriculture, State Planning Board) to explore policy level challenges in EAS

• Identify what evidence policy makers look for from extension research? Is the evidence available? If so what form? (Reports, Briefs etc), If not, develop a plan

• Explore how different stakeholders influence policies (eg: policy advocacy of prominent NGOs, private sector and public sector) -What mechanisms and tools they use

• Identify policy level bottlenecks that constrain effective EAS delivery at the district level- Eg: Issues around linkages between KVK and ATMA; inter-departmental collaboration; public private partnerships; joint action etc.

Teaching Methods/ Activities

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

Learning outcome

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

– Appreciate the role of policies in shaping performance of extension

– Understand how to generate and communicate policy relevant evidence

– Critically evaluate extension policies in different countries

– How to engage in policy advocacy.

Suggested Reading

AEPF. 2015. Report on the Policy Forum by Ghana Directorate of Agricultural Extension Services, Ministry of Food and Agriculture; Modernizing Extension and Advisory Services and Agriculture Policy Support Project, Ghana. http://www.g-fras.org/en/knowledge/documents/category/18-policy.html?download=490: report-on-the-ghana-agricultural-extension-policy-forum-2015

Amosa, MDU. 2018. Policy Analysis and Engagement Toolkit. A guide for Pacific Non-government Organizations in the Fisheries Sector. WWF. http://d2ouvy59p0dg6k.cloudfront.net/downloads/policy_analysis_toolkit_quality.pdf Anonymous.N.d. Policy analysis. http://www.egyankosh.ac.in/bitstream/123456789/25760/1/Unit-19.pdf

Anonymous. N.D. Policy analysis. https://web.csulb.edu/~msaintg/ppa670/670steps.htm

Bardach E. A Practical Guide for Policy Analysis The Eightfold Path to More Effective Problem Solving Fourth Edition. Sage Publications. CQ Press. http://dlib.scu.ac.ir/bitstream/Ebook/32773/2/9781608718429.pdf Cairney P. 2015.
Chapter 2: Policymaking in the UK: What is Policy and How is it Made?. Policy and Policymaking in the UK. Sprechmann. S and Pelton. E 2001.
Advocacy Tools and Guidelines Promoting Policy Change. Cooperative for Assistance and Relief Everywhere, USA. https://onthinktanks.org/wp-content/uploads/2016/01/CARE_Advocacy_Guidelines.pdf
Start D and IngieHovland. 2004. Tools for Policy Impact: A Handbook for Researchers. Overseas Development Institute. https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/194.pdf Sulaiman RV and Hall A. 2005.
Extension Policy at the National Level in Asia. Plant Production Science Vol 8, 308-319. https://www.tandfonline.com/doi/pdf/10.1626/pps.8.308
Sulaiman RV. 2014. How to Develop and Implement Extension Policies? Lessons from Four Australasian Countries. Global Forum for Rural Advisory Services, Switzerland http://compendium.g-fras.org/component/phocadownload/category/27-checklists-stepwiseapproaches.html?download=263:
how-to-develop-and-implement-extension-policies-lessonsfrom-four-australasian-countries The Policy Project. 1999.
Networking for Policy Change An Advocacy Training Manual. The Futures Group International, Research Triangle Institute (RTI) and The Centre for Development and Population Activities (CEDPA). http://www.policyproject.com/pubs/AdvocacyManual.pdf

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		END SEM University Exam	Mid term exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	P	Total
PHDEXT 602	Methodologies for Social and Behavioural Research	60	0	40	30	20	2	1	3

1. Legends: L - Lecture**; P –** Practical

**2. ***Teacher Assessment shall be based on following components: Quiz / Assignment / Project /Participation in Class.

Aim of the course

This course aims to equip the doctoral students to conduct outcome-oriented social and behavioural science research and to develop sound field focused extension strategies and models with adequate replicability, while advancing knowledge on processes governing success of those strategies. The focus of the course is on equipping the scholars with advanced capacities in conducting systematic, objective and outcome oriented research by applying state-of-art methods and tools at every stage of research from planning to publishing.

The course is organized as follows:

No.	Blocks	Units
1.	Advanced methods for improving quality of research data Instruments	1. Measurement Properties of Research 2. Threats to Data Quality
2.	Scales, indexes and tests	3. Scales, Indexes and Tests-1 and 2
3.	Emerging research approaches	4 Qualitative Research Methods and designs Emerging Approaches 5 Utilising research outputs- Publishing Research. Ethics in Extension Research

Theory

Unit 1: Measurement properties – Dimensionality, reliability and validity; Dimensionality – Unidimensionality and multidimensionality, Methods of assessing dimensionality, Formative and reflective constructs; Validity - Importance, Internal validity - face validity; content validity, Substantive Validity, Structural Validity; External validity - Convergent and Discriminant Validity, known-group validity, Criterion-Related Validity, Consequential Validity, nomological validity; Methods of assessing various forms of validities – Judges rating, Lawshe's Content Validity Ratio, Item-objective congruence index; latent variable method; Reliability - Internal consistency reliability – Split-Half, Cronbach alpha; Temporal Stability reliability - test-retest method; Interrater Consistency and Consensus – inter rater reliability and interrater agreement; Alternative Forms or parallel forms reliability – Reliability of difference - Factors Affecting the Validity and Reliability of Test Scores; Generalizability Theory

Unit 2: Errors and biases; Errors – Meaning and sources; Types - Sampling error, Nonsampling or measurement error and Processing error – Meaning, causes; Effects of errors and biases on data quality;

Bias in behavioural research – Meaning, causes, Types – Respondent and researcher biases; Methods of reducing errors and biases in surveys, questionnaires, personal interviews, focus groups and online method.

Unit 3: Approaches to measurement and scale development - Classical test theory. Formative or index models, The C–OAR–SE approach and Item Response Theory; Item analysis in Classical test theory – item difficulty and item discrimination; Scoring performance in scales and tests – meaning, types and methods; Scale development strategies – deductive and empirical; Stimulus-centred scales – method of equally appearing intervals, paired comparison, Person scaling – Q methodology; Subject centre scales – The Likert scale and Semantic Differentia.

Steps in constructing a multi-dimensional scale using confirmatory factor analysis,; Response scales - Guttman's scalogram analysis and The Rasch method; Indexes –Meaning, types, importance; Similarities and differences with scales, Methods of constructing indexes; Common indexes used in extension. Measurement invariance –Meaning, types, methods of assessing measurement invariance. Tests – meaning, types, importance; steps in conducting various tests – knowledge test

Unit 4: Qualitative methods – Meaning; Types – Ethnography, Grounded theory, Phenomenology, Ecological psychology, Discourse Analysis; Observational research; Case study research – Sampling and sample size; Data collection methods - Indepth interviews, Focus groups, Direct observation, Record review; Content analysis; Unobtrusive Measures; Projective and semi-projective techniques; Selecting right qualitative method – Strengths and limitations of qualitative research; Analysis and interpretation of qualitative research data; Research synthesis – meaning, importance, methods; Systematic reviews and meta analysis – meaning, steps, and applications; Policy research.

Mixed methods research – meaning, purpose, types and applications; Participatory research – Meaning, importance, types, methods and tools and applications; Action research – Meaning, importance, Principles, Types, Steps in conducting action research, application in behavioural sciences. Social Network Analysis – Meaning, importance, types, steps in social network analysis, applications; Advanced methods of measuring perception and beliefs. Multi criteria decision making, analytical hierarchy approach

Unit 5: Publishing Research Scholarly communication process; Research reports – Meaning, types, contents; Presentations – Meaning, types, principles of good presentation - Tell 'Em" and KISS 'Em" principles; Research publications – meaning, importance, types; Guidelines for preparing research papers - Peer review process, citation styles; Open access publishing; Publishing in social media. Software in academic writing.

Ethics in Extension Research Ethics in conducting behavioural research; Human subject research – Meaning, history, and ethical guidelines; Ethical aspects of collecting and using Indigenous knowledge and farmers technologies; Ethical practices in publishing; Plagiarism – meaning, sources, Identifying and correcting plagiarism in a research paper using anti-plagiarism software

Practicals

Practice in developing research instruments • Methods of assessing measurement properties of research instruments - dimensionality, reliability and validity • Hands-on exercise in minimising errors and biases • Hands-on experience in constructing tests, scale and indexes • Practice in summated scale development using confirmatory factor analysis • Hands on experience in assessing measurement invariance • Practicing and collecting data using participatory tools and techniques, analyzing and interpreting qualitative data • Hands-on experience in writing systematic review using meta-analysis • Field practice in conducting action research • Practical experience in writing research paper • Hands on exercises using software for qualitative data analysis • Practice in detecting and correcting plagiarism using software

Teaching Methods/ Activities

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

Learning outcome

The scholars should develop critical skills in conducting systematic and objective research by using robust methods while minimising biases and errors – The students should intelligently choose and apply advanced methods and tools at every stage of research and execute them in a objective way by managing the actors and processes effectively – The students should develop expertise in designing tests, scales and indexes along with other tools to measure the socio-psychological processes at individual, group and community levels

Suggested Reading

Berg B. 2009. Qualitative Research. Methods for the Social Sciences.

Boston: Allyn& Bacon. Creswell JW .2007. Qualitative inquiry and research design: Choosing among five approaches (2nd ed.). Thousand Oaks, CA: SAGE Pub.

Edwards AL. 1957. Techniques of attitude scale construction. East Norwalk, CT, US: AppletonCentury-Crofts. Furr,

RM. 2011. Scale construction and psychometrics for social and personality psychology. Los Angeles: SAGE Pub.

Malhotra, NK. 2010. Marketing research: An applied orientation. Sixth Edition. Upper Saddle River, NJ: Prentice Hall Pub.

Netemeyer RG, Bearden WO and Sharma S. 2003. Scaling procedures: issues and applications. Thousand Oaks: SAGE Publications.

Nunnally, JC, and Bernstein IH. 1994. Psychometric theory (3rd ed.). New York, NY: McGrawHill Rao, C.R. and Sinharay S. 2007. Handbook of Statistics, Vol. 26: Psychometrics, The Netherlands; Elsevier Science

B.V. Raykov T and Marcoulides GA. 2010. Introduction to Psychometric Theory. New York, NY:

Taylor & Francis Scott J and Carrington PJ. 2011. The SAGE handbook of social network analysis. London: SAGE.

Sekaran U and Bougie R. 2013. Research Methods for Business A Skill-Building Approach. 6th Edition, Wiley, New York.

Sivakumar PS, Sontakki BS, Sulaiman RV, Saravanan R and Mittal N. (eds). 2017. Good Practices in Agricultural extension Research. Manual on Good Practices in Extension Research and Evaluation. Agricultural Extension in South Asia. Centre for research on innovation and science and policy (CRISP), Hyderabad. India. http://www.aesanetwork.org/ wp-content/uploads/2018/07/6.pdf

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PHDEXT-STAT 601	Multivariate Statistical Methods For Extension Research	60	0	40	30	20	2	1	3

1. Legends: L - Lecture**; P –** Practical

**2. ***Teacher Assessment shall be based on following components: Quiz / Assignment / Project /Participation in Class.

Aim of the course

This course aims to equip the students with critical skills in choosing appropriate analytical tools and interpreting the results for solving complex and multidimensional extension research problems.

The course is organized as follows:

No.	Blocks	Units
1	Overview of Multivariate Statistical	1. Basics of Multivariate Statistical Methods Methods Classification and Types of MVSM .Selecting Appropriate MVSM. A structured Approach for Building Multivariate Statistical Models. Basic Econometric Methods-1 and 2 2 . Missing Data Analysis and Outlier Management. Testing Assumptions of MVSM and Data Transformation. Assessing Human Preference Structures Using Conjoint Analysis. 3. Assessment of Adoption of Agricultural Technologies Using Limited Dependent Variable Models. Multidimensional Scaling. Multi-criteria Decision-making
2	Multiple Correlations and Multiple Regressions	4. Multiple Correlations and Multiple Regressions 5. Methods Of Grouping Objects

Theory

Unit 1: Basics of Multivariate Statistical Methods (MVSM) What is multivariate data analysis; Basic concepts in MV – variate, measurement error; Power analysis and effect size; SPSS software. Classification and Types of MVSM Independence and dependence techniques; Factor analysis – principal component, exploratory factor analysis; Multiple correlation and multiple regression; Discriminant analysis; Logistic regression; Cluster analysis; Conjoint analysis; Multi Dimensional Scaling/ Perceptual mapping; Correspondence analysis; Structural equation model. Selecting Appropriate MVSM Selection based on purpose - Dimension reduction, identifying latent variables, Social Sciences: Agricultural

Extension Education 317 strength of relationship among multiple dependent/ independent variables, identifying choice and estimating their utility; etc and type of variables – metric and non-metric.
A Structured Approach for Building Multivariate Statistical Models Steps in planning and conducing MVSM Unit 5: Basic Econometric Methods-1 Nature of regression analysis; Two variable and multivariable regression models; Linear and non-linear regression models; Estimation methods. Basic Econometric Methods-2 Simultaneous-equation models; Panel data models; Forecasting - Time series and other models

Unit 2: Missing Data Analysis and Outlier Management Missing data - Meaning, types, methods of missing data processing, advantages and limitations, Outliers- Meaning, types, methods for identifying and managing outliers. Testing Assumptions of MVSM and Data Transformation Testing assumption of parametric analyses – normality, linearity, multicollinearity; Data transformation methods. Methods for Assessing Human Choice/ Preferences and Decision making. Assessing Human Preference Structures Using Conjoint Analysis Meaning- Importance, guidelines for selecting variables, steps in designing a conjoint experiment – objectives, design, data collection and analysis. Applications in extension.

Unit 3 Assessment of Adoption of Agricultural Technologies Using Limited Dependent Variable Models Meaning, importance, types – logit, probit and to bit and their variations; steps in analysis and interpretation of results, applications in extension. Multidimensional Scaling Meaning, importance and types, steps and applications in extension. Multi-criteria decision-making Meaning, importance, methods – analytical hierarchy process, Applications in extension

Unit 4: Multiple Correlations and Multiple Regressions Meaning, importance, types, methods of estimation, analysis and interpretation of results, application sin extension .
Discriminant Analysis Meaning, types, steps in conducting discriminant analysis, Applications in extension

Unit 5: Methods Of Grouping Objects/ Variables Based On Latent Variables Unit 1: Principal Component Analysis (PCA) and Common Factor Analysis Meaning, importance, types of factor analysis, difference between types, steps in conducting PCA/ Common Factor Analysis, applications in extension.
Structural Equation Modelling (SEM) – Two units Meaning, importance, types – confirmatory factor analysis and structural model; steps in conducting SEM, Applications in extension
Cluster Analysis Meaning, importance, types – Steps; Applications in extension
Emerging MV Statistical Methods Unit 1: Emerging MV Statistical Methods Canonical correlation, partial least square (PLS)

Practicals

• Hands on experience of following methods using SPSS/ AMOS software • Selecting appropriate MVSM • Missing data analysis and outlier management • Testing assumptions of MVSM and data transformation • Assessing human preference structures using conjoint analysis • Assessment of adoption of agricultural technologies using limited dependent variable models – logit, probit and tobit. • Multidimensional scaling • Multiple correlation and multiple regression • Discriminant analysis • Principal Component Analysis (PCA) and Common Factor Analysis • Structural Equation Modeling (SEM) • Cluster analysis

Teaching Methods/ Activities

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

Learning outcome

This course will equip students with perspectives, knowledge and skills to develop a comprehensive understanding of the livelihood concepts, various forms, approaches, tools and techniques to analyze existing livelihood pattern and strategies the sustainable livelihood intervention in the rural areas.

Suggested Reading

Agresti, A. 2002. Categorical data analysis. Second edition. New York, NY: John Wiley & Sons. Belsley, D. A. 1991. Conditioning diagnostics: Collinearity and weak data in regression. New York, NY:
Wiley. Bollen, K.A. 1989. Structural equations with latent variables. New York:
John Wiley and Sons. Burnham, K. P. and Anderson, D. R. 2002. Model selection and multimodel inference. New York, NY: Springer.
Byrne BM. 2010. Structural equation modeling with AMOS: Basic concepts, applications, and programming. New York: Routledge. Chambers,
J., Cleveland, W., Kleiner, B., and Tukey, P. 1983. Graphical methods for data analysis. Wadsworth. Field A. 2013. Discovering statistics using IBM SPSS Statistics, 4th edition. Sage, London. Greene,
W. 2000. Econometric Analysis Fourth edition. New York, NY: Wiley.
Hair JJF, Black WC, Babin BJ and Anderson RE. 2010. Multivariate Data Analysis: A Global Perspective. 7th Edition, Pearson.
Hosmer, D. W. and Lemeshow, S. 2000. Applied logistic regression. Second edition. New York, NY: John Wiley & Sons Kelloway, K. E. 1998. Using LISREL for structural equation modeling: A researcher's guide. Thousand Oaks: Sage Long,
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