

**Master of Education (M. Ed.)**

**Title of the Course: R4.2: Introductory Experimental Research Method  
(Semester: III)**

**Credits: 4**

**MM: 100 (External: 70, Internal: 30)**

**Contact Week 15**

**Introduction of the Course**

This course is a research-based course which has been designed with the aim of developing understanding about the experimental research method and its depths. This course also encourages literature research by collecting data, research papers and articles about various dimensions of experimental research method and their applications. An expert in the field of education can't be a real expert without having knowledge of experiment in education. For having an in-depth knowledge and understanding of the field of experiments in education, one needs to develop critical understanding of the concept and designs of experimental research. Designs, appropriateness and variance control are important aspects in this regard which one must learn focusing on their advantages, limitations and specific applications with respect to specific design.

**Learning Outcomes**

After completion of the course student will be able to:

1. develop understanding of experimental research method and its various dimensions
2. differentiate between and control the factors affecting experimental validity
3. collect literature and research papers related to experimental research method and analyze them
4. analyze and comprehend various experimental designs with reference to their applications
5. prepare and develop research papers related to experimental research method

**Number of Units: 5**


**Weeks 15 = 60 hours**

**Unit 1: Experimental Research**

**(3 weeks = 12 hours)**

- John Stuart's Law of a Single Variable, Method of Difference as the basis of experimental research.
- Variables: Independent Variable (Treatment Variable, Organismic Variable), Dependent Variable, Confounding Variable (Intervening Variable, Extraneous Variable).
- Experimental group and control group, characteristics of experimental research: control, manipulation, observation, replication.

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Head/Dean

विभागाध्यक्ष एवं संकाय अध्यक्ष  
शिक्षा विभाग/Deptt. of Education  
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- Control: Elimination, randomization, conversion of extraneous variable into independent variable, matching cases, group matching, analysis of co-variance.

**Unit 2: Variance Control in Experimental Research (3 weeks = 12 hours)**

- Experimental design as a variance control mechanism, experimental variance, systematic variance, error variance, control of extraneous variables, statistical principle of controlling variance 'Maximum Minimum Control Principle'
- Maximizing experimental variance, experimental conditions, minimizing error variance (controlled conditions, increasing reliability of measurements)
- Controlling extraneous variables: Elimination, randomization, matching the subjects by replacing extraneous variables as independent variables, matching groups and co-variance analysis.

**Unit 3: Experimental Validity (4 weeks = 16 hours)**

- Internal validity and external validity
- Internal validity: influencing external variables (history, maturity, pre-testing, measurement error, statistical regression, experimental mortality, selection bias, interaction effect)
- External validity: influencing factors (pre-treatment, artificial experimental setting)

**Unit 4: Experimental Design Criteria and Types (2 weeks = 8 hours)**

- Criteria of a good experimental design: Appropriateness, Adequate control, Validity
- Types of experimental design: Pre-experimental design, Quasi-experimental design, True experimental design

**Unit 5: Experimental Design Cases (3 weeks = 12 hours)**

- Pre-experimental design: one shot case study, single group pre-test post-test design, static group design
- Quasi-experimental design: non-equivalent pre-test post-test design, counter balanced design
- True experimental design: Post-test only equivalent groups design, Pre-test post-test equivalent groups design, Solomon four groups design

**Practicum/ Suggested Projects / Assignments (Any Two)**

1. Exploring recently published Experimental studies using different higher-level designs.
2. Criticizing recently published Experimental studies using different higher-level designs.
3. Designing and implementing an experimental study using higher level designs.
4. Analyzing the sampling designs used in various experimental researches.
5. Writing a research paper using experimental research.

**Note:** On the basis of the above, the teacher may design his/her own relevant projects/ assignments.

### Essential/ Recommended Readings

- Best, J. W. & Kahn J. V. (2005). Research in education. New Delhi: Prentice Hall of India Pvt. Ltd.
- Broota, K.D. (1992). Experimental Design in Behavioural Research. New Delhi: Wiley Eastern Limited.
- Campbell, D.T. & Stanley, J.C. (XXXX). Experimental and Quasi-Experimental Designs for Research. Chicago: Rand McNally College Publishing Company.
- Cohen, L., Manion, L. & Morrison, K. (2007). Research methods in education (6th ed.). London: Routledge Falmer, Taylor and Francis Group.
- Cooper, D. R., Schindler, P. S. & Sharma, J. K. (2013). Business research methods. McGraw Hill Education Pvt Ltd., New Delhi.
- Creswell, J. W. (2008). Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th ed.). Boston: Pearson.
- Cronbach, L. J. (1990). Essentials of psychological testing. New York: Harper and Row.
- Garrett, H. E. (2005). Statistics in psychology and education. New Delhi: Paragon International Publishers.
- Guilford, J. P. & Fruchter, B. (1978). Fundamental statistics in psychology and education. New York: McGraw Hill.
- Kerlinger, F. N. (1978). Foundations of behavioural research. Delhi: Surjeet Publications.
- Koul, L. (1993). Methodology of educational research. New Delhi: Vikas Publishing House Pvt. Ltd.
- McGuigan, F. G. (1990). Experimental Psychology: Methods of Research. PHI Private Ltd, New Delhi, pp. 270-282.
- Monge, P. & Williams, F. (2001). Reasoning with statistics: How to read quantitative research (5th ed.). Orlando, Florida, USA: Harcourt College Publishers.
- Morrow, J. R., Jackson, A. W., Disch, J. G. & Mood, D. P. (1995). Measurement and evaluation in human performance. Illinois: Human Kinetics.
- Muijs, D. (2004). Doing quantitative research in education. London: SAGE Publications.
- Opie, C. (2005). Doing educational research: A guide to first time researchers. New Delhi: Vistaar Publications.
- Robson, C. (1994). Experiment, design and statistics in psychology (3rd ed.). England: Penguin Books.
- Sani, F. & Todman, J. (2006). Experimental design and statistics for psychology: A first course. MA, USA: Blackwell Publishing.
- Sharma, R. A. (2004). Essentials of scientific behavioural research. Meerut: Surya Publication.
- Singh, A. K. (1992). Research methods in psychology, sociology and education. Delhi: Motilal Banarasidas.
- Singh, A. K. (2001). Test, measurements and research methods in behavioural sciences.

Delhi: Bharati Bhawan.

- Singh, K. (2007). Quantitative social research methods. Los Angeles: SAGE Publications.
- Wiersma, W. (1991). Research methods in education. Boston: Allyn and Bacon.

### **Teaching Learning Resources (Digital and others):**

UNESCO Website, NCERT Website, MoE Website, UGC Website, NCTE Website and various other relevant websites

### **Teaching Learning Process**

The course will be taught through interactive pedagogic methods such as classroom discussion, debates, film discussions, critical media analysis, collaborative learning tasks which enhance reading comprehension of core writings in the area and innovative projects. Reflective expression and learning will be encouraged.

### **Assessment Method**

The assessment will be formative in nature and will factor in student participation. Individual and group tasks and assignments will be given. Summative evaluation will be done through end-semester examination.

**Key words:** Experimental Research, Variance Control in Experimental Research, Experimental Validity, Experimental Design Criteria and Types, Experimental Design Cases