

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

**Title of the Course: R4.5: Psychometric Research in Education  
(Semester: III)**

**Credits: 4**

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

**Contact Week 15**

**Introduction of the Course**

The goal of psychometric research is to evaluate the human psyche in novel ways and to obtain important insights into it. It is essential to raise the measurement's efficacy. To put it simply, psychometric research explores the development and verification of assessment instruments, including questionnaires, personality tests, assessments, and rater judgments. Creating new methodologies, standards, and suitable scoring schemes for psychometric instruments, establishing the validity and reliability of the evidence, and addressing various facets of the theory and application of psychometric assessment are all part of psychometric research.

**Learning Outcomes**

After completion of the course, student will be able to:

1. Develop critical understanding about the concept of psychometric research in education in a broad and contemporary educational framework.
2. Analyse and comprehend various types of psychological tests used in research and their construction with reference to factor analysis and modeling.
3. Critically look into various psychometric properties of a test
4. Understand the advanced psychometric approaches and its applications in educational research.

**Number of Units: 4**

**Weeks 15 = 60 hours**

**Unit 1: Psychometrics in Educational Research**

**(3 weeks = 12 hours)**

- Concept, Scope of Psychometrics
- Psychological tests in Educational Research, scales of Measurement
- individual differences and correlations

**Unit 2: Test dimensionality and Factor Analysis**

**(4 weeks = 16 hours)**

- Multidimensional tests, Exploratory Factor analysis,
- Confirmatory Factor analysis, Structural Equation Modeling (SEM)

**Unit 3: Reliability and Validity**

**(4 weeks = 16 hours)**

- Conceptual basis, empirical estimates of reliability, factors affecting reliability of test scores
- Classical Test Theory, Validity Evidences and Estimation

**Unit 4: Advanced Psychometric approaches**

**(4 weeks = 16 hours)**

21

- Item Response Theory (IRT), Measurement Models, Rasch Models, Generalizability Theory, Software for Psychometrics

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

1. Construction of a test
2. Establishing reliability and validity of Tool
3. Developing appropriate norms
4. Analyse existing research tools and their development process
5. Review of a standerdized tests
6. Review of a thesis/Dissertation in which psychometric methods adopted

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

#### Essential/ Recommended Readings

- Aiken, L. R. (1996). *Rating scales and checklists: Evaluating behaviour, personality, and attitudes*. New York: Wiley.
- Aiken, L. R. (1997). *Questionnaires and inventories: Surveying opinions and assessing personality*. New York: Wiley.
- American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (1999). *Standards for educational and psychological testing*. Washington, DC: American Educational Research Association.
- American Psychological Association. (1953). *Ethical standards of psychologists*. Washington, DC: Author.
- American Psychological Association. (2002). Ethical principles of psychologists and code of conduct. *American Psychologist*, 57, 1060–1073.
- Baker, F. B. (2001). *The basics of item response theory* (2nd ed.). Retrieved May 10, 2003, from <http://ericae.net/irt> [currently available from <http://edres.org/irt/baker/>]
- Bollen, K. A., & Long, J. S. (Eds.). (1993). *Testing structural equation models*. Newbury Park, CA: Sage.
- Bond, T. G., & Fox, C. M. (2001). *Applying the Rasch model: Fundamental measurement in the human sciences*. Mahwah, NJ: Erlbaum.
- Brennan, R. L. (2001). *Generalizability theory*. New York: Springer.
- Cronbach, L. J. (1949). *Essentials of psychological testing*. New York: Harper & Row.
- DeVellis, R. F. (2003). *Scale development: Theory and application* (2nd ed.). Thousand Oaks, CA: Sage.
- Embretson, S. E., & Reise, S. P. (2000). *Item response theory for psychologists*. Mahwah, NJ: Erlbaum.
- Finch, W. H and French, B. F (2019). *Educational and Psychological Measurement*. London: Routledge.
- Haladyna, T. M. (1997). *Writing test items to evaluate higher order thinking*. Boston: Allyn & Bacon.
- Haladyna, T. M. (1999). *Developing and validating multiple-choice test items* (2nd ed.). Mahwah, NJ: Erlbaum.

22



- Keith, C (2010). An Introduction to Psychological Assessment. Los angeles: SAGE.
- R. K. Hambleton & J. N. Zaal (Eds.), *Advances in educational and psychological testing* (pp. 3–43). Boston: Kluwer.
- Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (pp. 573–660). San Diego, CA: Academic Press.
- Rust, J. and Golombok, S. (2009) . Modern Psychometrics. London: Routledge
- Linn, R. L., & Gronlund, N. E. (1995). *Measurement and assessment in teaching* (7th ed.). Upper Saddle River, NJ: Merrill.
- Maruish, M. E. (Ed.). (2004). *The use of psychological testing for treatment planning and outcome assessment* (3rd ed., Vols. 1–3). Mahwah, NJ: Erlbaum.
- McClelland, D. C. (1958). Methods of measuring human motivation. In J.W. Atkinson (Ed.). *Motives in fantasy, action, and society* (pp. 7–45). Princeton, NJ: Van Nostrand.
- Paul, K (1986). A handbook of Test Construction. London: Routledge.

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

- American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). Standards for educational and psychological testing. Washington, DC: American Educational Research Association. The standards are publicly available here: <https://www.testingstandards.net/open-accessfiles.html>
- Educational Measurement, 4th Edition. ISBN: 978-0275981259  
<http://www.amazon.com/Educational-Measurement-American-Council-Education/dp/0275981258>
- Test Equating, Scaling, and Linking, 2nd Edition. ISBN: 978-1441923042  
<http://www.amazon.com/Test-Equating-Scaling-Linking-Statistics/dp/1441923047>
- Generalizability Theory: A Primer. ISBN: 978-0803937451  
<http://www.amazon.com/Generalizability-Theory-Measurement-Methods-Science/dp/0803937458/>
- Fundamentals of Item Response Theory. ISBN: 978-0803936478  
<http://www.amazon.com/Fundamentals-Response-Measurement-Methods-Science/dp/0803936478/>
- Applications of Item Response Theory to Practical Testing Problems. ISBN: 978-0898590067 <http://www.amazon.com/Applications-Response-Practical-Testing-Problems/dp/089859006X/>

#### 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 the end-semester examination.

**Keywords:** Psychometric Research, Factor Analysis, Structural Equation Modeling, IRT.



Head/Dean  
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24