

**SCED 574.01
TEST CONSTRUCTION
IN SCIENCE&MATH.ED.
SUMMER 2026**

Instructor: Dr. Serkan ARIKAN

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Time & Place: TTWWThTh343434

Office Hours: Thursday: 10.00-11.00

COURSE DESCRIPTION

This is a test construction course for graduate students to integrate assessment into instructional planning to improve student learning and to conduct research using scales or achievement tests. The course discusses methods for planning assessments that are integrated with instruction, crafting assessment tools, and conducting psychometric analysis. Additionally, the scale development and adaptation procedures are covered. The course discusses attributes of assessment practices such as reliability, validity, classical test theory item analysis, item response theory item analysis, scale development and adaptation, standard setting and measurement invariance.

COURSE OBJECTIVES

By the end of the semester, students will be able to:

Describe assessment, test and measurement.

Describe the general principles of assessment.

Describe and use reliability and validity concepts and methods.

Distinguish between validity and reliability concepts.

Describe the factors that influence validity and reliability of test scores.

Carry out basic statistical methods to test and interpret the results of validity and reliability of test scores.

Conduct item analyses in CTT and IRT.

Follow the procedures to adapt a scale.

Conduct measurement invariance analysis.

TEXTBOOKS

Baker, F. (2001). *The Basics of Item Response Theory*. ERIC Clearinghouse on Assessment and Evaluation, University of Maryland, College Park, MD.

Crocker, L., & Algina, J. (2008). *Introduction to classical and modern test theory*. Mason, OH: Cengage Learning

DeVellis, R. F. (2012). *Scale development. Theory and applications* (3rd ed.). Thousand Oaks, CA: Sage.

TENTATIVE COURSE SCHEDULE:

Week	Date	Topic	Chapters Crocker and Algina	Chapters Devellis
1	24-25 June 2026	Reliability	Ch6, Ch7	Ch3
2	30 June 2026	Validity	Ch10	Ch4
2	1-2 July 2026	Validity & Factor Analysis (EFA)	Ch13	Ch6
3	7-9 July 2026	Factor Analysis (CFA)	Ch13	Ch6
4	14 July 2026	Scale Development	Ch4	Ch5
4	16 July 2026	Scale Development: Item Analysis (Classical Test Theory)	Ch14	
5	21 July 2026	Scale Development: Item Analysis (Classical Test Theory)	Ch14	
5	22-23 July 2026	Scale Development: Item Analysis (Item Response Theory)	Ch15	Ch7
6	28-30 July 2026	Scale Development: Item Analysis (Item Response Theory)	Ch15	Ch7
7	4-6 August 2026	Measurement Invariance	Ch12, Ch16	
8	11-12 August 2026	Scale Adaptation and Adaptive Testing	ITC Guideline*	

*https://www.intestcom.org/files/guideline_test_adaptation_2ed.pdf

GRADING

Homework: 20%

Project: 30%

Final Exam: 40%

Attendance: 10%

Over 42 hours, students who did not attend more than 12 hours will automatically fail.
(70%)

Distribution of Grades

100-90: AA

74-70: CC

89-85: BA

69.-below: F

84-80: BB

79-75: CB

THE PROJECT

- As a group project, you will develop or adapt a scale following the procedures described in the course with the guidance of the instructor.

COURSE EXPECTATIONS AND POLICIES

- You are expected to follow and use the moodle page of this course. Submit your assignment here even if you will hand in a hardcopy of it.
- ***Late submissions are not accepted.***

Professionalism

Professional behavior is expected at all times in class and while collaborating outside of class with others to complete work related to the class. Some of these behaviors include:

- **Attendance:** Attendance to the course is compulsory. Attend all classes as much as possible –do not make medical and other appointments during class time. Arrive on time and do not leave early.
- **Punctuality:** Assignments are handed in on-time. Type your assignment according to the **APA** writing manual (Be careful to give reference in the text and in the reference list). Submit your assignments in electronic format using the moodle page.
- **Participation & Readiness:** Check the syllabus weekly to see what is due and what is expected of you. Read weekly reading assignments. Interact with your course instructor and members of class in a positive manner. Cooperate constructively with peers. Be a positive contributor in your group work. Throughout the class time, show enthusiasm on learning activities, provide insights to the class discussion.

Academic Dishonesty

Academic dishonesty on any assignments and tasks cannot be tolerated in this course. Serious acts of academic dishonesty will result in automatic failure of the course. Be aware of **types of academic dishonesty** such as plagiarism, cheating, duplicate submission. **Plagiarism** is the most common type. It is “presenting someone else’s work or ideas as your own, with or without their consent, by incorporating it into your work without full acknowledgement. All published and unpublished material, whether in manuscript, printed or electronic form, is covered under this definition. Plagiarism may be intentional or reckless, or unintentional.” Check the following addresses for detailed information about plagiarism:

<https://www.ox.ac.uk/students/academic/guidance/skills/plagiarism?wssl=1>