Karolinska Institutet

DEPARTMENT OF CLINICAL SCIENCES, DANDERYD HOSPITAL

D1F6084, Measuring Cognition in Medical Research, 1.5 credits (hec)

Att mäta kognition i medicinsk forskning , 1,5 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by The Committee for Doctoral Education on 2025-09-03, and is valid from spring semester 2026.

Responsible department

Department of Clinical Sciences, Danderyd Hospital, Faculty of Medicine

Prerequisite courses, or equivalent

No prerequisite courses, or equivalent, demanded for this course.

Purpose & Intended learning outcomes

Purpose

Assessing cognitive functioning is a key component of many research projects. However, it is a complex task influenced by numerous factors.

This course is designed to provide doctoral students, who intend to include cognitive measures in their research, with a foundational understanding in cognitive test theory and elementary knowledge of cognitive functions in both healthy subjects and individuals with certain medical conditions, such as chronic pain, endocrinological disorder and other somatic conditions. This knowledge aims to support accurate interpretation of test results and minimize the risk of misinterpretation.

A further aim of the course is to introduce commonly used cognitive tests and screening batteries, including their administration and interpretation. Emphasis is placed on appropriate test selection, understanding what each test measures, and interpreting results in research context. The course also addresses common methodological pitfalls in research and ways to avoid them.

Intended learning outcomes
By the end of the course, the student will be able to:

- Define central concepts such as neuropsychology, cognition, and intelligence,
- Describe some of the most used tests, including the cognitive function/s measured, and brain areas/networks implicated,
- Critically reflect on the reliability and validity of different tests and screening instruments including practice effect if the study participants are tested repeatedly,
- Reflect on the pros and cons of short screening batteries versus a more comprehensive assessment in the context of medical research,
- Reflect on different ways of analyzing cognitive test data, such as test-by-test or by combining scores into summary/composite scores,
- Describe selected injuries (e.g. traumatic brain injury, stroke) and medical conditions (e.g. post-concussion symptoms, post COVID-19 condition, ADHD, endocrinological disorders, chronic pain), and their associated cognitive deficits.
- Assemble a cognitive test or screening protocol for a specific research question and critically address possible limitations of the protocol.

Course content

During this course, the participants will learn elementary principles of how to measure cognition in medical research. The course includes two blocks. In the first block, the emphasis is on test administration and result interpretation. In the second block, the focus shifts to injuries and medical conditions, the cognitive deficits they entail, and the selection of appropriate tests to assess these deficits. Participants will also have the opportunity to discuss specific issues related to their own projects in a seminar format.

Forms of teaching and learning

Lectures by invited experts and group exercises in seminars.

The course runs daytime over the equivalent of one full-time week. The first four days include key lectures by invited experts, seminars, and group presentations, both in small groups and with the entire class.

The seminars involve discussions of specific methodology applied to various clinical cases and provide opportunity to become familiar with different cognitive tests.

The fifth and final day will consist of an oral and written examination where participants will present their research projects, outline their plans for investigating cognitive functions, and explain how potential cognitive impairments will be evaluated. Participants will also provide feedback on each other´s work.

Language of instruction

The course is given alternately in Swedish and English

The course will be held in Swedish if only Swedish speeking participants have applied.

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components
Mandatory attendance to all scheduled activities. Absence can be compensated with supplementary written task.

Forms of assessment
To show that the intended learning outcomes for the course have been reached, the students will be assessed through active participation in course discussions and the submission of a written study plan proposal, in which cognitive assessment is a key component. The proposals will be presented and discussed at the end of the course.

Course literature

Handouts and articles covering the lectures will be provided by the lecturers/course organizers during the course.

The following book is recommended:

Lezak, M. D., Howieson, D. B., Bigler, E. D., & Tranel, D. (2012). Neuropsychological assessment (5th ed.). Oxford University Press.