DEPARTMENT OF WOMEN'S AND CHILDREN'S HEALTH

K6F5255, Early Child Development: Extended Interactions Between Neural Networks, Body and Environment, 1.5 credits (hec)

Barnets hjärna: utveckling i samspel mellan neuronala nätverk, kroppen och omgivningen, 1,5 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by The Committee for Doctoral Education on 2023-12-07, and was last revised on 2025-09-16. The revised course syllabus is valid from spring semester 2026.

Responsible department

Department of Women's and Children's Health, Faculty of Medicine

Prerequisite courses, or equivalent

This doctoral-level course is intended for PhD students interested in early childhood brain development, focusing on brain maturation and function.

Purpose & Intended learning outcomes

Purpose

The main aim of this course is to introduce students to the core concepts of early child neurodevelopment as a process that begins with acquiring basic functions and evolves into becoming a thinking human.

The course covers the brain-body networks and their vulnerability during early development. Additionally, it emphasizes the importance of early clinical assessment, and intervention strategies for children at high risk of adverse outcomes. The course also briefly reviews current and future imaging techniques for assessing neurodevelopment, including early ultrasound and brain MRI.

The course will focus on the clinical aspects of child neurodevelopment and will not cover basic knowledge, such as pre-clinical models. The emphasis will be on putting translational research

into clinical practice.

Intended learning outcomes

By the end of the course the student should be able to:

- Demonstrate a critical understanding of how early neurodevelopment in children unfolds over time – from basic motor functions to more complex executive functions– trough the dynamic interaction of brain-body networks and the influence of both internal factors (e.g., disease) and external stimuli (e.g., environmental conditions).
- Explain the concepts of early disease and the risk of long-term effect on neurodevelopment, and the benefit of plasticity of the young brain.
- Demonstrate reasoning skills in the clinical assessment of brain functions, and possibilities for detection of high-risk children.
- Describe how clinical follow-up programs, early interventions, and policies can support children's development.

Course content

This course will cover 5 modules over 5 days;

1) The development of brain networks: continuous feedback from the body and the environment

2) From motor abilities to abstract thinking

3) Connections between aberrant developmental processes and neurodevelopmental disorders

4) Early evaluation, follow-up and repair strategies

5) Future directions: advanced neuroimaging data analytic approaches and integration with biological measures

Forms of teaching and learning

Lectures by invited national and international experts on the field, seminars, work in groups, students' presentations. There will also be time every day for literature review and preparation for the examination seminar.

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components

All lectures and seminars are compulsory. Absence from a lecture or seminar might be compensated for by a written assignment. Please be aware of KI's policy if using AI assistance

when writing. https://medarbetare.ki.se/forskarutbildning/dags-att-forsvara-avhandlingen/anvandning-av-generativ-ai-vid-skrivande-av-akademiska-texter-inom-utbildning-pa-forskarniva)

Forms of assessment

The students should demonstrate their knowledge, skills and critical understanding included in the intended learning outcomes stated above in a concluding examination seminar at the end of the last day and in discussions during the course. They should also reflect on the aspects that are relevant for their own research in discussions.

Course literature

The course organizers will prepare relevant research papers and reviews that will be distributed in advance of the course.