Syllabus

PhD Course Doctoral programme in Special Education directed towards Early Interventions in Early Childhood Education

Neuroscience of Basic and Applied Special Education Research, 7,5 credits

Svenska titel: Neurovetenskap i grund – och tillämpad specialpedagogisk forskning

7,5 ECTS credits
Course code: UQ009FU
Valid from: Spring semester 2020
Date of approval: 2019-10-22
Department: Special Education
Subject: Special Education

Decision

Course plan approved by the Board of the Department of Special Education.

Prerequisites and special admittance requirements

Admitted to a PhD program. PhD students admitted to the Doctoral program in Special Education directed towards Early Interventions in Early Childhood Education have priority.

Behörighetskrav: Studenter som är antagna till forskarutbildning har behörighet att gå kursen. Forskarstuderande som är antagna till Forskarskolan i specialpedagogik med inriktning mot tidiga insatser i lärandemiljöer inom förskola och under de första skolåren har företräde.

Learning outcomes

After having completed the course, course participants will be able to:

- Understand the development of the brain and brain functions relevant to early interventions and applied research in special education.

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- Reason about normative variation of development, and how to differentiate it from atypical development in children.
- Comprehend the impact of brain and cognitive functions on children's learning and adaptive capacities.
- Critically reflect over the use of diagnostic instruments to assess development and developmental alterations, and the use and limitations of early intervention techniques.
- Reflect upon and compare high-end neuroscientific imaging methods, and their sense and non-sense in special education research.
- Be aware of the complexity of neuroscientific evidence, and how they affect thinking in social, psychological and philosophical views of special education of children.
- Reflect upon how diverse neurodevelopmental conditions affect cognition and everyday functions, and the significance of these challenges for special education research.

Course content

This course broadly covers neuroscientific areas of relevance for early special education research. It entails the development of the human brain and cognitive functions, as well as deviances from these developments and their consequences; how developmental levels and alterations of development can be assessed and early behavioral strategies to facilitate development and learning. Diverse neuroscientific imaging and other methods are introduced, and the significance of neuroscience for special education is discussed. The relevance of the neurosciences for special education research is further exemplified by a comprehensive contents regarding research on neurodevelopmental conditions. During the course, the students will learn about of the potential and limitations of neuroscientific evidence for educational research and practice, and reflect on how to use the existing knowledge and techniques in their special education research. They will also reason about the philosophical and social aspects of neuroscience and their implications for special education research.

Contents of the course includes:

- Prenatal and first year's development of the human brain and central nervous system.
- Social, cognitive and motor development of the child.
- Behavioral analytic approaches to enhance developmental trajectories and foster learning.
- The presentation, consequences of extreme prematurity and intervention options
  The detection and assessment of early developmental concerns.

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- The basics and application of neuroimaging and other neuroscience techniques, including magnet encephalography (MEG); electro encephalography (EEG); neurofeedback and working memory training; structural, functional, and resting state magnet resonance imaging (sMRI, fMRI, rsMRI), diffusion tensor imaging (DTI), molecular imaging (positron emission tomography [PET], magnet resonance spectroscopy [MRS], single -photon emission computed tomography [SPECT]; eye-tracking; and genetic analyses methods.
- The neuroscience, psychology and sociology of pedagogy using examples from creativity, mind set research, brain research of reading and neuro-education.
- The neuroscience of developmental conditions: autism spectrum disorder, language disorders, Tourette's syndrome, attention-deficit hyperactivity disorder, genetic syndromes, intellectual disability, and developmental coordination disorder.

Education

Lectures, webinars, site visits (with own experience of being tested, measured and trained), and activities on web platform.

Forms of examination

Oral and written examinations.

Course literature

Current list of literature is published on the institution's website www.specped.su.se . Current list of literature is available no later than two months before the start of the course.

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