# Course syllabus

<table>
<thead>
<tr>
<th>Course title</th>
<th>Cognitive development from pre-birth to old age: a research perspective</th>
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<tbody>
<tr>
<td>Instructor</td>
<td>Laura Hokkanen, PhD, professor of clinical neuropsychology</td>
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<td>Contact details</td>
<td><a href="mailto:laura.hokkanen@helsinki.fi">laura.hokkanen@helsinki.fi</a></td>
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<tr>
<td>Affiliation</td>
<td>University of Helsinki, Finland</td>
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<tr>
<td>Course format</td>
<td>lecture</td>
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<tr>
<td>Number of hours</td>
<td>17</td>
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<tr>
<td>Number of ECTS credits</td>
<td>2 ECTS</td>
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17 hours of class, estimated 2 hours of preparation for each of the 6 classes, estimated 3 hours of writing after each of the 6 classes (summary of the reading, learning journal), total of 46-50 hours.

| Brief course description  | The course will present a lifetime approach to cognition. It explores how perinatal factors affect brain development and cognition in childhood, how childhood cognition and developmental deficits along with acquired brain lesions affect cognition in midlife, and finally how midlife cognition affects ageing and neurodegenerative processes. Longitudinal studies will be used as study material. Neuropsychological as well as neuroimaging methods for assessing cognition are presented and discussed. |
| Full course description   | The course will present a lifetime approach to cognition. It will start by describing perinatal factors influencing brain development and childhood cognition, and looks at the correlation between childhood IQ and adult IQ, along with the modifying factors. Second theme centers on current and emerging neuroimaging methods, their clinical use, and discuss what imaging can and cannot tell about cognition. Third theme focuses on developmental disorders such as dyslexia and ADHD, and will follow trajectories of affected individuals from childhood into adulthood. Fourth theme is midlife cognition where acquired neurological conditions such as stroke and traumatic brain injury, and their neuropsychological implications will be reviewed. Potential childhood factors behind these midlife health events are discussed. Fifth theme focuses on cognitive aging and the factors influencing it. Normal and pathological aging, MCI, Alzheimer’s disease, other degenerative disorders, and their typical clinical pictures are reviewed and the relationship between prior developmental deficits in cognitive ageing process is discussed. Final theme will summarize and discuss neuropsychological assessment as a tool for understanding lifetime cognitive trajectories. |

The required reading will focus on longitudinal studies such as the Seattle longitudinal study of intelligence, the British and Lothian birth cohort studies, and the Nun study. Examples will be drawn from the ongoing Perinatal Adverse events and Special Trends in Cognitive Trajectories (PLASTICITY) study.
### Learning outcomes

At the end of the course students will be able to name and describe several notable longitudinal studies that are neuropsychologically interesting. They will be able to explain what is understood by perinatal risk factors and why they are relevant to cognitive development. Students understand the long term outcome of developmental deficits and will also be able to explain how midlife cognition is related to cognitive aging.

### Learning activities and teaching methods

Meetings will include both lecture and group discussions. First part of each class is a lecture on a given theme. Every student reads two articles (provided by the teacher) on that theme before class and during the second part of the class students discuss them, as well as the lecture content, in small groups (20% of the final mark). The class ends with a brief written reflection, a ‘one-minute paper’, where students write down the most important thing they learned and what they understood least or want clarified more. Those are turned in anonymously (no names or student id numbers) and used for adjusting the teaching during the course.

After each class student writes a synthesis of the learned material (the articles and the lecture content) in form of a reflective learning diary/journal. Learning diaries are handed in at the beginning of the next class (student id numbers as identifiers). They are used for course assessment (80% of the final mark).

### List of topics/classes and bibliography

#### 1. course introduction, development of cognition (3h)

Everyone please read


The second article to be read will be one of the following (detailed instructions will be given before the course begins, depending on the number of enrolled students)


#### 2. neuroimaging of cognition (3h)

First, please navigate to [https://en.wikipedia.org/wiki/Neuroimaging](https://en.wikipedia.org/wiki/Neuroimaging) and familiarize yourself with computerized tomography, MRI, functional MRI and positron emission tomography. Follow the first link under each heading and read the article. There are fascinating discoveries to be made by following the links found under the heading “See also”. It will be assumed, that participants master the basic terminology and a have
(intuitive) understanding on how the magic behind these methods works.

Second, read these two articles:

Optional:

Literature relating to longitudinal studies mentioned in other sessions:

3. developmental cognitive deficits (3h)
Each student reads two of the following articles (detailed instructions will be given before the course begins, depending on the number of enrolled students)


4. acquired cognitive disorders and related neuropsychological symptoms (3h)
Everyone should get this article for reference and briefly look at the concepts therein. We will continue discussing it on session 6:


Everyone please read this:


The second article to be read will be one of the following (detailed instructions will be given before the course begins, depending on the number of enrolled students)
Deary, Ian J. (2009) Introduction to the special issue on cognitive epidemiology. Intelligence 37.6 517-519. + selected papers in the special issue


5. aging and decline of cognition (3h)
Each student reads two of the following articles (detailed instructions will be given before the course begins, depending on the number of enrolled students)

- Gow, A. J. et al. (2012). Is age kinder to the initially more able?: Yes, and no. Intelligence, 40(1), 49–59.
- Snowdon, D. A., et al. (1996). Linguistic ability in early life and

6. neuropsychological assessment as a diagnostic tool, course summary (2h)
Focus on neuropsychological assessment methods mentioned in papers above. Articles that were not discussed earlier can be discussed here (detailed instructions will be given later, depending on the reading list given at the beginning of the course and the progress made during the course)
Everyone should read these:

Assessment methods and criteria
Assessment is based on activity in the group discussions (20%) and the learning journals (80%). Students are given instructions at the beginning of the course on what the journals should contain and how they are evaluated.
- Evaluation points for the learning journal: Presentation and discussion of the central content, argumentation and language, independent thinking and reflecting, the quality of the learning journal as a memo.
- Evaluation points for the group discussions: demonstration of having read the assigned articles, activity in discussion of the content of articles assigned both to self and others

Attendance rules
Students are expected to attend all 6 classes. One unexcused absence is allowed. If there is more than one absence, additional work may be required.

Prerequisites
Completed course on Neuropsychology

Academic honesty
Students must respect the principles of academic integrity. Cheating and plagiarism (including copying work from other students, internet or other sources) are serious violations that are punishable and instructors are required to report all cases to the administration.

Basket
Course is part of the Neuropsychology and Neuroscience specialization

Remarks