

# Introduction to Cognitive Science BSc Cognitive Science (E2021)

## Coordinator and contact

Daina Crafa

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**Textbook:** <https://www.stakbogladden.dk/soegning.asp?phrase=9781473774353>

## Purpose of the course

This introductory course is designed to lay the foundation for the degree. In Introduction to Cognitive Science, you will learn about the theoretical, evidential, and methodological core of your new discipline. Our focus will be on state-of-the-art knowledge about how the different functions of the mind work. You will learn about how people construct their perception of the world around them, and how they filter and prioritize which information they should be paying attention to. You will learn about how people use their imagination to solve problems and navigate their world, and about how people learn, form new memories, and develop skills and expertise. You will learn about how people make decisions, and about the role that emotions play in cognition. You will learn about how we might be able to program computers to also do some of these things, and about how all of these functions are implemented in the human brain. Most important, you'll also learn about *how* we know all of these things, as we explore the ways that theories and experiments work together to build the science of human cognition. In addition to this core knowledge, we may also be visited by guest lecturers, who will help us to place the research we will discuss in a broader context.

## Examination

The final examination for course is an oral examination, which will focus on the information in the assigned textbook chapters. Students will be given 30 minutes to prepare for the examination, which will last for 30 minutes.

See below for further details on the exam and study regulations.

## Tutorial Activities

The tutorial activities are designed to provide students with the opportunity to actively engage with the theoretical material; to introduce students to experimental methodologies used in cognitive science; and to practice analyzing, discussing, and presenting scientific concepts and ideas. In this way, the tutorials are designed to provide students with core skills necessary to develop into cognitive scientists, and with opportunities to actively prepare for the examination. More details about tutorial activities will be given in week 1 of classes.

## Accessing Required Readings

Most weeks will focus on the core principles from the assigned textbook chapters and will include short readings and discussions about individual differences and human variation that are related to these core principles. Optional readings are also provided for students who want to learn more about each topic.

The textbook for the course is *Cognitive Psychology (2nd edition)* by Goldstein & van Hoof. Although the book is marketed to upper-level undergraduate classes in cognitive psychology, Goldstein & van Hoof's approach blends interdisciplinary perspectives in a way that is particularly well suited to our course. The book is available at Stakbogladden.

Other readings are taken from journals, online sources, or books. For journals and online material, the references are given below, and the material should either be available directly online, or via e-journals through AU library. We will discuss how to access this material in the first tutorial class. For copyright reasons, students are required to access most of this material themselves, but let me know if you have any trouble.

## Course Outline & Required Readings

### Lecture 1 (week 35) – What is Cognitive Science?

#### Readings

- 1) **Textbook reading:** Goldstein, B., & van Hoof, J.C. (2021). Cognitive Psychology (2nd edition). Cengage. **Read Chapter 1 – Introduction to Cognitive Psychology**
- 2) **Individual differences reading:** Henrich, J., Heine, S.J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature*, 466(7302), 29.

### Class 2 (week 36) – Cognitive Neuroscience

#### Readings

- 1) **Textbook reading:** Goldstein, B., & van Hoof, J.C. (2021). Cognitive Psychology (2nd edition). Cengage. **Read Chapter 2 – Cognitive Neuroscience**
- 2) **Individual differences reading:** Maguire, E. A., Gadian, D. G., Johnsrude, I. S., Good, C. D., Ashburner, J., Frackowiak, R. S., & Frith, C. D. (2000). Navigation-related structural change in the hippocampi of taxi drivers. *Proceedings of the National Academy of Sciences*, 97(8), 4398-4403.

### Class 3 (week 37) – Perception

#### Readings

- 1) **Textbook reading:** Goldstein, B., & van Hoof, J.C. (2021). Cognitive Psychology (2nd edition). Cengage. **Read Chapter 3 – Perception**
- 2) **Individual differences reading:** Sturmberg, J. P. (2011). The illusion of certainty—a deluded perception? *Journal of Evaluation in Clinical Practice*, 17(3), 507-510.

### Class 4 (week 38) – Attention

#### Readings

- 1) **Textbook reading:** Goldstein, B., & van Hoof, J.C. (2021). Cognitive Psychology (2nd edition). Cengage. **Read Chapter 4 – Attention**
- 2) **Individual differences reading:** McIntyre, M. M., & Graziano, W. G. (2016). Seeing people, seeing things: Individual differences in selective attention. *Personality and Social Psychology Bulletin*, 42(9), 1258-1271.

### Class 5 (week 40) – Memory

#### Readings

1) **Textbook reading:** Goldstein, B., & van Hoof, J.C. (2021). Cognitive Psychology (2nd edition). Cengage. **Read Chapters 5 & 6 – Short-term and Working Memory & Long-term Memory: Structure**

2) **Individual differences reading:** Miller, A. L., Gross, M. P., & Unsworth, N. (2019). Individual differences in working memory capacity and long-term memory: The influence of intensity of attention to items at encoding as measured by pupil dilation. *Journal of Memory and Language*, 104, 25-42.

## Class 6 (week 41) – Knowledge

### Readings

1) **Textbook reading:** Goldstein, B., & van Hoof, J.C. (2021). Cognitive Psychology (2nd edition). Cengage. **Read Chapter 9 – Knowledge**

2) **Individual differences reading:** Jack, A. E., & Roepstorff, A. E. (2003). Preliminary remarks. In *Trusting the subject?* Vol. 1. Imprint Academic.

## Class 7 (week 43) – Research Ethics (Guest lecture: Joshua Skewes)

### Readings

- 1) Completion of ethics course in protecting human research participants (Just take Modules 1 and 3.1: <https://elearning.trree.org/>).
- 2) Alternatively, take the NIH protecting human research participants course <https://phrp.nihtraining.com/users/login.php> (Free archived version here: [Protecting Human Research Participants \(nih.gov\)](https://www.nih.gov/protecting-human-research-participants))
- 3) Holm, S. (2006). The Danish Research Ethics Committee System: Overview and Critical Assessment (Research Involving Human Participants V2). Online Ethics Center for Engineering <http://www.onlineethics.org/cms/8082.aspx>
- 4) Kramer, A. D. I., Guillory, J. E., & Hancock, J. T. (2014) Experimental evidence of massive-scale emotional contagion through social networks. *Proceedings of the National Academy of Sciences*, 111(24), 8788-8790.
- 5) Vaughn, L. (2006). Writing Philosophy. Extract on Brightspace

### Class work

Writing a consent form for an experiment (MW)

## Class 8 (week 44) – Problem Solving

### Readings

1) **Textbook reading:** Goldstein, B., & van Hoof, J.C. (2021). Cognitive Psychology (2nd edition). Cengage. **Read Chapter 12 – Problem Solving**

2) **Individual differences reading:** Grossnickle, E. M., Dumas, D., Alexander, P. A., & Baggetta, P. (2016). Individual differences in the process of relational reasoning. *Learning and Instruction*, 42, 141- 159.

## Class work

Problem solving exercises (MS)

## Class 9 (week 45) – Judgement, Reasoning, and Decisions (Guest lecture: Joshua Skewes)

### Readings

- 1) **Textbook reading:** Goldstein, B., & van Hoof, J.C. (2021). Cognitive Psychology (2nd edition). Cengage. **Read Chapter 13 – Judgement, Reasoning, and Decisions**
- 2) **Individual differences reading:** Buchtel, E. E. K. (2009). Thinking across cultures: Implications for dual processes.

## Class work

TBA (MW)

## Class 10 (week 46) – Emotions and Cognition

### Readings

- 1) **Textbook reading:** Ward, J. (2020). The Student's Guide to Cognitive Neuroscience (4<sup>th</sup> edition). Routledge. **Read Chapter 16 – Emotion and Social Cognition** ([https://www.dropbox.com/s/8xatd22yrgtysse/Ward\\_2020\\_The\\_Students\\_Guide\\_to\\_Cognitive\\_Neuroscience.pdf?dl=0](https://www.dropbox.com/s/8xatd22yrgtysse/Ward_2020_The_Students_Guide_to_Cognitive_Neuroscience.pdf?dl=0))
- 2) **Individual differences reading:** Engelmann, J. B., & Pogosyan, M. (2013). Emotion perception across cultures: the role of cognitive mechanisms. *Frontiers in psychology*, 4, 118.

## Class work

System 1 and system 2 emotions (MS)

## Class 11 (week 47) – Social Cognition

### Readings

- 1) **Textbook reading:** Ward, J. (2020). The Student's Guide to Cognitive Neuroscience (4<sup>th</sup> edition). Routledge. **Read Chapter 16 – Emotion and Social Cognition** ([https://www.dropbox.com/s/8xatd22yrgtysse/Ward\\_2020\\_The\\_Students\\_Guide\\_to\\_Cognitive\\_Neuroscience.pdf?dl=0](https://www.dropbox.com/s/8xatd22yrgtysse/Ward_2020_The_Students_Guide_to_Cognitive_Neuroscience.pdf?dl=0))
- 2) **Individual differences reading:** Shaw, D. J., Czeikoova, K., Pennington, C. R., Qureshi, A. W., Špiláková, B., Salazar, M., ... & Urbánek, T. (2020). You ≠ me: individual differences in the structure of social cognition. *Psychological research*, 84(4), 1139-1156.

## Class work

TBA (MW)

## Class 12 (week 48) – Review of Core Topics and Conclusions

### Readings

No readings required – revision time

### Class work

Friendly mock exam (MW & MS)

## Study regulations

<https://eddiprod.au.dk/EDDI/webservices/DokOrdningService.cfc?method=visGodkendtOrdning&dokOrdningId=16337&sprog=en>

Description of qualifications:

### **Purpose:**

The purpose of the course is to introduce students to the field of cognitive science. In the course, students acquire knowledge of major theories of cognitive function, knowledge of key experiments supporting those theories, and skills in discussing and communicating this knowledge.

The course includes an introductory survey of the main topics in cognitive science. Topics covered include basic cognitive functions, such as perception, attention, memory, etc. The course includes an overview of some of the main theories of cognitive processing, and some of the key experimental evidence used to support those theories.

This survey course sets the foundations for the rest of the degree programme, and informs all other courses.

### **Academic objectives:**

In the evaluation of the student's performance, emphasis is placed on the extent to which the student is able to:

Knowledge:

- describe major theories of basic cognitive functions. Examples include perception, attention, memory, language, emotions and decision-making
- explain the relation between various cognitive functions
- describe experimental evidence supporting theories of basic cognitive functions.

Skills:

- discuss and communicate theories of cognitive functions
- discuss and communicate experimental evidence for theories of cognitive functions.

Competences:

- navigate primary research literature in cognitive science, and identify relevant sources for reference in own projects
- organise knowledge of major experimental and theoretical work in cognitive science, and apply this knowledge in oral communication about the field.

Forms of instruction:

- Lecture
- Classroom instruction

Comments on form of instruction:

Teaching involves a combination of lectures and classroom instructions. Classroom instruction may include some mix of discussion group exercises, writing exercises and feedback, and other group work.

Language of instruction:

The rules governing language of exam and teaching are stated in section 2.1 of the academic regulations.

Exam language:

- English

Exam options:

Oral

**Exam duration:** 30 minute(s)

**Preparation time:** 30 minute(s)

**Materials permitted:** All

**Form of co-examination:** Internal co-examination

**Assessment form:** 7-point grading scale

**Comments:**

**Ordinary examination and re-examination:**

The exam is an individual oral exam including preparation time. The student draws a question which must be prepared for the oral presentation. The oral exam is based on the student's presentation followed by a dialogue between the student and the examiner in which the rest of the course syllabus is included.

Preparation time: 30 minutes.

Duration: 30 minutes.

All aids permitted.