

Course Guide – Master Cognitive Science

Winter 2023/24

Version as of 06.10.2023

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Enrollment for Courses

Students are automatically registered for the preparatory courses. Students have to register for their regular courses via eCampus. All relevant information concerning eCampus (e.g. ID and password) are provided during the enrolment process. If you have any technical problems concerning eCampus please contact the Helpdesk.

Please register for your courses as soon as you receive access to eCampus. The registration deadline is usually at the beginning of October. If you fail to register during this time span, please contact the instructor of the respective course, for example, at the first session. Only the instructors can register you later on.

Please note that some courses will not be available for registration on eCampus. This mainly concerns lectures and seminars offered by the Institute of Neuroinformatics. Again, please attend the first session and talk to the instructor. If a registration via eCampus is not possible, this should be indicated in the Course Guide.

Please remember always to check time, place and CP for your classes in eCampus and/or with the respective course instructor. These details in the course guide are subject to change and for your convenience only.

Please be reminded that you can choose maximally 15 CP in courses which are taught in German.

If you have taken a class already in your Bachelor's, you cannot take the same class again in your Master's.

Essay Writing Course:

One of the basic skills that need to be acquired during the program is the ability to write academic essays. This skill is not taught as one of the Basic Methods. It needs to be acquired during your course work. To do so, each student must write at least one essay in their first year of study, typically in C1 to C4. Students with little or no background in academic writing should write their essay in one of the courses that are sub-labelled "essay writing course". Those courses enable you to write academic texts as it will be needed for your master thesis, conference applications, or job applications.

FIRST YEAR PROGRAM

Every student is strongly recommended to participate in the preparatory courses. The course "Academic English" need not be passed by native speakers of English. The course "Biostatistics" need not be passed by students who have a standard BA in psychology. The course "Mathematics and Computerscience for Modeling" need not be passed by students with a BA in mathematics or informatics.

Preparatory Courses

Academic English

SEMINAR

ENGLISH FOR MASTER COGNITIVE SCIENCE (251209)

SETH BERK

TERM:	Winter 2023/24
MEETING TIME:	Block: September 25 – October 6, 12.30 - 14.30 during the semester: tba
ROOM:	IA 1/91 (In Person)

This course is directed towards students who have been admitted to the Master of Cognitive Science programme at the Ruhr-University Bochum and who can benefit most from an improvement of their language skills based on their results in the language assessment test. It offers a fast-paced introduction to Academic English in the field of Cognitive Science.

The English course is divided in the block seminar (preparatory class) which focuses on speaking and a course during the winter semester that focuses on academic writing. If you are registered for the English Preparatory Class, please make sure you take one of the essay writing classes in the winter semester (Dr. Alfredo Vernazzani: Seeing-As: Perception and Imagination from Kant to Artificial Intelligence or Dr. Lukas Hahn: Short Format Scientific Communication). The English class during the winter semester will provide you with valuable feedback regarding the English language based on the texts written for the essay writing course.

Biostatistics

SEMINAR

BIOSTATISTICS (119212)

MARTIN BORDEWIECK, M.SC.

TERM:	Winter 2023/24
MEETING TIME:	September 25 – October 6, 08.30 - 11.30 exception: no Biostatistics class on 26.09. & 2.10. as substitution additional classes on 5.10. & 6.10., 15 - 18
ROOM:	IA 0/158-79 (PC-Pool 1) (In Person)

“Biostatistics” will cover the basic statistical methods used by researchers in the life sciences to collect, summarize, analyse, and draw conclusions from data. The topics include descriptive statistics, univariate statistical tests, and experimental design.

Informatics and Mathematics

SEMINAR

**MATHEMATICS AND COMPUTER SCIENCE FOR MODELING
(119219)**

DANIEL SABINASZ, M.SC.

TERM:	Winter 2023/24
MEETING TIME:	September 25 – October 4, 15.00 - 17.30 as substitution for 5. & 6.10.23: additional classes on 26.09 & 2.10., 09.00 – 11.30
ROOM:	IA 0/158-79 (PC-Pool 1) (In Person)

The "Informatics and Mathematics" preparatory course will combine a hands-on introduction to programming in python with a revision of elementary mathematical concepts. The topics include data types, data structures, control structures and data visualisation on the programming side and they will be applied to vector/matrix calculation, integration/differentiation of functions and differential equations.

A1. Introduction to Cognitive Science

A1

Introduction to Cognitive Science

LECTURE & EXERCISE

INTRODUCTION TO COGNITIVE SCIENCE (LECTURE 119217 & EXERCISE 119218)

PROF. JONAS ROSE, PROF. ALBERT NEWEN, PROF. TOBIAS SCHLICHT, PROF. ONUR GÜNTÜRKÜN, PROF. NIKOLAI AXMA-CHER, PROF. ROBERT SCHMIDT, PROF. MARKUS WERNING, LENA PFEIFER, PROF. GREGOR SCHÖNER, PROF. LAURENZ WISKOTT, PROF. SEN CHENG

TERM:	Winter 2023/24
LECTURE:	Tuesday, 12 – 14 (First Meeting: 17.10.2023)
ROOM:	IA 1/157 and IA 02/461 (see schedule Moodle course)
EXERCISE:	Wednesday, 14 – 16 (First Meeting: 18.10.2023)
ROOM:	IA 1/161 and IA 0/158-79 PC-Pool 1 (see schedule Moodle course)
CP:	6

Attention:

- Further details of the Lecture and Exercise plan will be announced later.

The lecture introduces the interdisciplinary field of cognitive science in combining philosophy, psychology, computational modeling and neurosciences. The lecture has the aim to deliver important basic knowledge from empirical sciences in the framework of theory formation. For cognitive science students the credit point can only be acquired on the basis of the written examination and it presupposes in addition some active work in the obligatory additional seminar.

The lectures will take place partly in IA 1/157 and partly in IA 02/461, a schedule will be provided.

Structure of the lecture is subject to changes.

The structure of the lecture:

1. Theoretical Frameworks in Cognitive Science 1
2. Theoretical Frameworks in Cognitive Science 2
3. Cognitive Models of Semantics and Pragmatics
4. Theories of Consciousness
5. Cognitive Neuroscience of Perception
6. Cognitive Neuroscience of Emotion
7. Theories of Emotion
8. Cognitive Neuroscience of Memory
9. Theory of Perception and Cognition
10. Recent Developments in Stress Research
11. Computational Approaches to Cognitive Science
12. Supervised Learning in Neural Networks
13. Reinforcement Learning in the Brain
14. Unsupervised Learning
15. Exam

BM. Basic Methods

Students are expected to choose (at least) three out of four basic methods: If you have a BA in psychology, you can skip the "Experimental Psychological Lab" but have to pass the three other basic methods. If you have a BA in philosophy, you can skip the course "Logic" but have to learn the other three methods. Some with a BA in neuroscience can skip method BM 4. All the other students need to study all basic methods. Exceptions can be made if someone can prove to have already studied the content of a course but need explicit approval by the program coordinator (cogsci-info@rub.de) or Prof. Dr. Jonas Rose.

BM1

BM1. Experimental Psychology Lab

SEMINAR

EXPERIMENTAL PSYCHOLOGICAL LAB (119213)

LAURA STEVENS

TERM:	Winter 2023/24
MEETING TIME:	Tuesday, 14.30 – 16.00 (First meeting: 17.10.2023)
ROOM:	GABF 05/602
CP:	6

The goal of the "experimental psychology lab" is the supervised implementation of an independent experimental study, including the research question, operationalization, data collection and statistical evaluation. The content of the study is to investigate possible mechanisms for an increased susceptibility to stress in socially isolated or lonely people. For example, a possible negative bias in emotion recognition can be tested experimentally. The results of this study will be presented in a written report.

SEMINAR

LOGIC AND PHILOSOPHICAL METHODOLOGY (030114)

JUN. PROF. DR. PETER BRÖSSEL

TERM:	Winter 2023/24
MEETING TIME:	Monday, 10 – 12 (First meeting: 09.10.2023)
ROOM:	GABF 04/354
CP:	6

The aim of this course is to provide an overview of the fundamental philosophical methods relevant for theory construction in cognitive science and in philosophy. Students will acquire

- (i) basic competences in classical logic and probability theory,
- (ii) an introduction to methods of concept clarification such as conceptual analysis, explication, and explicit and implicit definitions and
- (iii) insights into the basics of constructing, testing, and revising theories and models within cognitive science and philosophy.

A part of the course will be devoted to practical exercises to consolidate the acquired competencies. A precondition for receiving ECTS points is 1.) to submit weekly homework regularly and 2.) to pass the written exam at the end of the course.

Literature:

Nolt J., Rohatyn D., Varzi A. 2011. Logic. Schaum's Outlines.

General Remark Concerning BM3 – Neural Networks

A basic course in neural networks is obligatory. Students have to pass only one course in BM3.

If you notice that are not equipped with the necessary mathematical groundwork for the courses offered in the winter semester, make sure to attend the Matlab seminar, only offered in summer semesters.

*LECTURE & EXERCISE***COMPUTATIONAL NEUROSCIENCE – NEURAL DYNAMICS
(212005)**

PROF. DR. RER. NAT. GREGOR SCHÖNER

TERM:	Winter 2023/24
LECTURE:	Thursday, 14.15 – 16.00 (First meeting: 12.10.2023)
ROOM:	NB 3/57
EXERCISE:	Thursday, 16.15 – 17.00 (First meeting: 12.10.2023)
ROOM:	NB 3/57
CP:	6

This is the standard course for the BM3 Module. But it requires quite some math preparation, typically as covered in two semesters of higher mathematics (functions, differentiation, integration, differential equations, linear algebra). The course does not make extensive use of the underlying mathematical techniques but uses the mathematical concepts to express scientific ideas. Students without prior training in the relevant mathematics may be able to follow the course but will have to work harder to familiarize themselves with the concepts.

This course lays the foundations for a neurally grounded understanding of the fundamental processes in perception, in cognition, and in motor control, that enable intelligent action in the world. The theoretical perspective is aligned with ideas from embodied and situated cognition but embraces concepts of neural representation and aims to reach higher cognition. Neural grounding is provided at the level of populations of neurons in the brain that form strongly recurrent neural networks and are ultimately linked to the sensory and motor surfaces.

The theoretical concepts on which the course is based come from dynamical systems theory. These concepts are used to characterize neural processes in strongly recurrent neural networks as neural dynamic systems, in which stable activation states emerge from the connectivity patterns within neural populations. These connectivity patterns imply that neural populations represent low-dimensional features spaces. This leads to neural dynamic fields of activation as the building blocks of neural cognitive architectures. Dynamic instabilities induce change of attractor states from which cognitive functions such as detection, change, or selection decisions, working memory, and sequences of processing stages emerge. The course partially follows a textbook (Dynamic Thinking—A primer on Dynamic Field Theory, Schöner, Spencer, and the DFT research group. Oxford University Press, 2016), of which chapters will serve as reading material. Exercises will focus on hands-on simulation experiments, but also involve readings and the writing of short essays on interdisciplinary research topics. See www.dynam-icfieldtheory.org for some of that material. Tutorials on mathematical concepts are provided, so that training in calculus and differential equations is useful, but not a prerequisite for the course.

Please find more information at <https://www.ini.rub.de/teaching/courses/>

*LECTURE & EXERCISE (+TUTORIAL)***ARTIFICIAL NEURAL NETWORKS (212006)**

PROF. DR. SEN CHENG

TERM:	Winter 2023/24
LECTURE:	Monday, 16 – 18 (First meeting: 09.10.2023)
ROOM:	HNC 30
TUTORIAL:	Wednesday, 10 – 12 (First meeting: 11.10.2023)
ROOM:	IA 0/158-79 (PC-Pool 1)
EXERCISE:	Friday, 10 – 12 (First meeting: 13.10.2023)
ROOM:	NC 6/99.
CP:	6

This course needs quite some math preparation including calculus, linear algebra, statistics and programming.

Artificial neural networks (ANN) were inspired by the architecture and function of the brain. Nevertheless, their greatest strength is not that they are good models of the brain, but rather that they are powerful function approximators. Since the 1980's many types of ANN have been developed and tricks for training ANNs on data proliferated. Recent advances in computing hardware and the availability of large datasets have made it possible to train ANNs such that they perform better than humans, e.g. on image recognition. In this class, students will, firstly, gain a theoretical understanding of the principles underlying the methods applied to neural networks and, secondly, learn practical skills in implementing neural networks and applying them for data analysis.

Topics: optimization problems, regression, logistic regression, biological neural networks, model selection, universal approximation theorem, perceptron, MLP, backpropagation, deep neural networks, recurrent neural networks, LSTM, Hopfield network, Boltzmann machine

Software: python, numpy, scipy, matplotlib, scikit-learn, tensorflow

There will be a written examination at the end of the course.

Prerequisites: Calculus, linear algebra, statistics, programming.

Registration: Please register via moodle: <https://moodle.ruhr-uni-bochum.de/m/course/view.php?id=>

*LECTURE***CLINICAL NEUROPSYCHOLOGY (112621)**

PROF. DR. BORIS SUCHAN

TERM:	Winter 2023/24
MEETING TIME:	Tuesday, 10 – 12 (First meeting 17.10.2023)
ROOM:	IA 02/461
CP:	3

The aim of the lecture is to introduce basic concepts of clinical neuropsychology. First of all, all methods used in human neuropsychological brain behavior research will be discussed. This is followed by an overview of the organization of the human brain, the structure and function of frontal, temporal, parietal and occipital lobes. Furthermore, the lecture deals with all neuropsychological syndromes that can be observed after brain damage. Assessment of neuropsychological functions will also be covered in this lecture.

Literature:

B. Kolb & I.Q. Whishaw (1996). *Fundamentals of Human Neuropsychology*. New York: Freeman.

K.M. Hellmann & E. Valenstein (1993). *Clinical Neuropsychology*: Oxford University Press.

C. Topics Selection

Remarks for Essay Writing

For all students who need to learn how to write an essay or still feel insecure about it, we recommend in the winter term the following two seminars:

“Seeing-As: Perception and Imagination from Kant to Artificial Intelligence” by Dr. Alfredo Vernazzani: It can be evaluated as C2 or AM1 course.

“Short format scientific communication” by Dr. Lukas Hahn.
It can be evaluated as C2 or C3 course.

C1

Social Cognition & Meta-Science

LECTURE

BASAL COGNITION (030087)

PROF. DR. TOBIAS SCHLICHT

TERM:	Winter 2023/24
MEETING TIME:	Wednesday, 16 – 18 (First meeting: 11.10.2023)
ROOM:	GA 03/46
CP:	tba

We discuss recent work on cognitive phenomena in simple biological systems such as single celled organisms (e.g., bacteria), slime moulds and plants. We will read texts from philosophers of mind and philosophers of biology and discuss whether there are good arguments for the claim that the behaviors exhibited by such simple systems count as cognitive, and if yes, how we should explain these cognitive capacities, which may be alien from the cognitive phenomena we know from our own case.

Introductory Literature:

Paco Calvo, 2023: *Planta Sapiens*. Little, Brown.

A Reader with texts will be provided in the first session.

C1

Social Cognition & Meta-Science

*COLLOQUIUM***LECTURE SERIES 'HISTORY AND PHILOSOPHY OF THE LIFE SCIENCES' (030134)**

JUN.PROF. DR. JAN BAEDKE

TERM:	Winter 2023/24
MEETING TIME:	Monday, 16 – 18
ROOM:	online
CP:	3

In this lecture series current topics in the history and philosophy of the life sciences will be discussed. The lecture series will host talks by international leading experts and local researchers, including philosophers and historians, but also social scientists and scientists. Participants will have the opportunity to present their master and doctoral theses. For students who want to receive course credits, please register via eCampus. Talks will be given in English and online (via Zoom). They will be announced on:

<https://rotorub.wordpress.com/roto-lecture-series/>

*BLOCK SEMINAR***FACT-CHECKING OF SCIENTIFIC CLAIMS: A PHILOSOPHY OF SCIENCE PERSPECTIVE (030059)**

PROF. DR. DUNJA ŠEŠELJA

TERM:	Winter 2023/24
MEETING TIME:	Block: 04.11.23, 16.12.23, 27.01.24, 10 - 16
ROOM:	Wasserstr. 221/4
CP:	3 or 6

Contemporary social discourse has been flooded by fake news, echo-chambers, epistemic bubbles and other epistemically pernicious processes. Scientifically relevant information has not been spared: from 'anti-vaxxers' to climate-change deniers, disinformation has also had an effect on scientifically relevant news.

To combat such issues, social media have introduced the practice of 'fact-checking'. However, fact-checking of scientific claims can be challenging. To start, neither does the frontier of scientific research typically produce 'facts', nor can such claims easily be 'checked'. Ongoing inquiry, often pervaded by scientific disagreements and controversies, is characterized by incomplete or conflicting evidence, and hence by a high degree of risk and uncertainty. At the same time, an unhinged spread of false or deceptive information can easily have numerous harmful consequences, including the loss of public trust in science.

In this block seminar we will start from the philosophical discussions on the evaluation of scientific hypotheses, and the role of values in scientific inquiry. In addition, we will look into recent controversies surrounding the fact-checking of scientific claims. Throughout the course, students will work in teams, where each team will choose a case-study to research. The result of the research will be presented in the final block. The course will consist of three blocks, to be held on Saturdays. In addition, teams will have (online) coaching sessions in between the blocks.

Literature: The reading list will be provided at the start of the course

SEMINAR

SOCIAL EPISTEMOLOGY: THE EPISTEMOLOGY OF EXPERT JUDGEMENTS (030088)

JUN.PROF. DR PETER BRÖSSEL

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 16 – 18 (First Meeting: 12.10.2023)
ROOM:	online
CP:	6

This online research seminar is conducted with Prof. Thomas Grundmann from the University of Cologne. Active participation is a prerequisite for the successful completion of the seminar.

Modern societies benefit significantly from a certain kind of specialist: well-trained cognitive experts who can draw on extensive societal resources for their research. These cognitive experts produce high-quality and often even in-depth knowledge in their fields, enabling technological and economic progress and serving as a reliable basis for political decision-making. Unfortunately, the more competent, specialized, sophisticated, and thus more successful cognitive experts are doing their job, the greater their cognitive distance from the folk will become and the harder it will be for laypeople to identify experts, to decide whom among disagreeing experts they should trust, to demarcate genuine experts from fake experts, or to hold on to their general trust in experts. This leads to philosophical questions such as the following ones: How should laypeople be able to tell who qualifies as an expert if they know very little, if not nothing, about the relevant field? How can they rationally decide who is more trustworthy when two experts disagree? How can the folk distinguish between true experts and incompetent people who do their best to appear as true experts by establishing their network of citations, alternative platforms, or even fake journals? And how can laypeople avoid general distrust in elites who are not even intelligible to them?

In preparation for each seminar session, we will read texts (these texts will be work-in-progress manuscripts) by world-leading philosophers that (try to) answer some of the above questions. In the seminar sessions, we meet online with the authors of each text to discuss critically and help to improve their work. Thus, students not only have the chance to discuss with leading social epistemologists but also have the opportunity to learn how philosophical articles are written and improved upon criticism.

SEMINAR

PHILOSOPHY OF MODELS AND SIMULATIONS (030062)

PROF. DR. DUNJA ŠEŠELJA

TERM:	Winter 2023/24
MEETING TIME:	Friday, 16 – 18 (exception: 06.12.23: 14-18)
ROOM:	Wasserstr. 221/4
CP:	3 or 6

Models are commonly used across sciences. What is more, they are of central importance in the production of scientific knowledge. Yet, how exactly we can learn from them, how do we determine what a model represents, and what kind of explanation it provides – are questions that are not easy to answer, which is why they have been hotly debated by philosophers. Take, for instance, highly idealized computer simulations, frequently developed in social sciences and in philosophy. What do such models represent? How are they related to the real-world? And when can we take results of such models seriously, for example, as the basis for policy guidance? Or consider opaque machine learning models, which can be used to make predictions. When do they help to increase our understanding of the world?

This course will consist of three parts:

1. In October and November we will discuss some of the central publications written on the above topics. The readings will be aimed at preparing students for talks by experts on the topic, which constitute part 2.
2. On the 6th of December, 2023 we will have a (full day) workshop in which experts working in this field will come to RUB and present their work. No further classes will take place in December. Instead, students will choose a topic related to one of the talks in the workshop and start their project on it. The topics for student projects will be agreed upon in (individual) online meetings. The project should result in a presentation and an essay.
3. In January classes will consist of student presentations, focusing on the projects agreed upon in December. We will also cover some additional readings, supplementing the student presentations.

SEMINAR

SOCIAL EPISTEMOLOGY: DIVERSITY AND WISDOM OF THE CROWDS (030078)

MATTEO MICHELINI

TERM:	Winter 2023/24
MEETING TIME:	Tuesday, 14 – 16 (First Meeting: 10.10.2023)
ROOM:	GABF 04/609
CP:	3 or 6

Have you ever wondered whether asking a large group of people to take political decisions is epistemically sound? Are you curious if an assembly of everyday (but diverse) citizens can outshine seasoned politicians in leading a city? Intrigued by whether or not a jury of laypeople surpasses a single worldly juror in judging defendants? If so, this course is made for you.

In recent years, philosophers have engaged in an ongoing debate to determine which communities excel at finding epistemic solutions and making informed decisions. This discussion has generated two fascinating hypotheses:

1. Diverse groups of problem-solvers trump non-diverse experts in decision-making.
2. Large groups of people, under specific conditions, exhibit remarkable epistemic accuracy (*Wisdom Of the Crowd*).

The implications of these hypotheses are profound. For instance, the second point serves as an epistemic justification for democracy, as it posits that democracy is the superior political system for making correct decisions. In this course, we delve into the arguments supporting and challenging both hypotheses, and explore their socio-epistemological validity. We also dedicate a brief section of the course to analyzing computational models that bolster these hypotheses. Furthermore, we discuss the role of these arguments in political philosophy, drawing parallels with the notions of epistemic diversity and epistemic performance in philosophy of science.

The course aims at fostering discussion among students through activities and "games" during the lectures. You will be encouraged to write and discuss various aspects of the topic. The course will be conducted in English, and the reading list will be provided as the course progresses. No prior knowledge is required to enroll. Graded and ungraded CPs are possible.

SEMINAR

EINFÜHRUNG IN DIE PHILOSOPHIE DER KÜNSTLICHEN INTELLIGENZ UND COMPUTERSIMULATION (030113)

JUN.PROF. DR. JOACHIM HORVATH

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 10 – 12 (First Meeting: 12.10.2023)
ROOM:	GABF 04/714
CP:	3 or 6

Language of Instruction: German

In diesem einführenden Seminar wollen wir uns mit grundlegenden philosophischen Fragen und Problemen beschäftigen, die sich aus der rasanten Entwicklung und stark zunehmenden alltäglichen Anwendung von Systemen der Künstlichen Intelligenz (KI) sowie von Computersimulationen virtueller Welten ergeben. Dabei werden wir unter anderem die folgenden Themen behandeln: Was ist KI, wie funktioniert sie und was kann sie schon? Welche Risiken und Chancen ergeben sich aus ihrer Anwendung? Führt der Einsatz von KI zum „Ende der Arbeit“ – und welche Fragen der sozialen Gerechtigkeit ergeben sich daraus? Kann aus KI eine Superintelligenz entstehen, die eine existenziellen Bedrohung für uns darstellt? Können KI-Systeme Geist und Bewusstsein entwickeln – und kann vielleicht auch unser eigener Geist „digitalisiert“ werden? Wie real sind eigentlich virtuelle Realitäten?

SEMINAR

SOZIALE KOGNITION (030107)

DR. ELMARIE VENTER

TERM:	Winter 2023/24
MEETING TIME:	Monday, 14 – 16 (First Meeting: 09.10.2023)
ROOM:	GA 03/46
CP:	3 or 6

Language of instruction: German

Die Interaktion mit anderen ist ein zentraler Bestandteil unseres täglichen Lebens. Wir sind in vielerlei Hinsicht zutiefst soziale Wesen, denn unser soziales Umfeld beeinflusst unsere Handlungs- und Interaktionsmöglichkeiten im Alltag. Andere dienen auch als Spiegel unserer eigenen Verhaltensweisen und

Absichten und spielen darüber hinaus eine Rolle dabei, wie wir unsere Überzeugungen und unser Verhalten gestalten. Es gibt mehrere wichtige philosophische Theorien zur sozialen Kognition, die den Kern dieses

Seminars bilden.

Einige Fragen, die behandelt werden sollen, sind:

- Wie gelingt uns anderen Menschen Überzeugungen und Absichten zuzuschreiben?
- Welche kognitiven Fähigkeiten sind erforderlich, um die mentalen Zustände eines anderen Menschen verstehen zu können?
- Ist die Fähigkeit mentale Zustände zuzuschreiben eine Fähigkeit, die nur Menschen besitzen?

Literatur:

Schlicht, T. (2018). *Soziale Kognition*. Junius Verlag: Hamburg

Weitere Texte werden zu Semesterbeginn auf Moodle bereitgestellt. Die weiteren Texte sind größtenteils englischsprachig.

LECTURE

DIE ZUKUNFT HUMANER ARBEIT IN EINER DIGITALISIERTEN WELT (118925)

JUN.PROF. DR. LAURA KUNOLD, PROF. DR.-ING. BERND KUHLENKÖTTER

TERM:	Winter 2023/24
MEETING TIME:	Part1: Tuesday (18.10.- 6.12.), Part 2: Thursday (15.12. - 2.2.2023), 16-18
ROOM:	Zess (Room tba)
CP:	3

Language of instruction: German

Interdisziplinäre Lehrveranstaltung im Wintersemester 2022/23 (10.10.2022 - 04.02.2023)

Die interdisziplinäre Ringvorlesung bietet ein breites Spektrum an Themen, die sich mit dem Wandel der menschlichen Arbeit in einer technologisierten Welt aus technischer und psychologischer Sicht beschäftigen.

Dozierende sind Mitglieder der Interdisziplinären ZESS-Community

Link zum ZESS:

<https://forschung.ruhr-uni-bochum.de/de/forschungszentrum-fuer-das-engineering-smarter-produkt-service-systeme-zess>

Format: Interaktive Ringvorlesung mit hohem Diskussion Anteil

SWS: 2

Prüfungsleistung: Semesterbegleitende Gruppenaufgabe + Ergebnispräsentation als Elevator Pitch (Video) à 2 Minuten pro Gruppe am Semesterende

Die dienstags und donnerstags **Termine sind hier zu finden (Die Themen/Titel sind allerdings noch vorläufig)**

<https://docs.google.com/document/d/1jzQ6j4TAzI6B1Cfn0G3tIpihqBHVdnsGV7blQh44jI/edit>

*SEMINAR***EXPERIMENTAL DESIGN AND RESEARCH METHODS (119222)**

JUN.-PROF. DR. RER. NAT. NADJA FREUND,
PROF. DR. ROBERT SCHMIDT, PROF. DR. JONAS ROSE

TERM:	Winter 2023/24
MEETING TIME:	Monday, 10 – 12 (first meeting: 16.10.2023)
ROOM:	GA 04/187
CP:	3

In this course you will learn how a new, collaborative research project is conceived. Three professors from different faculties (Psychology, Medicine, and Computer Science) come together to showcase the process of starting a new research project. You will learn about the different stages of developing a research project, including brainstorming initial ideas, reviewing the relevant literature, designing the corresponding experiments, as well as planning the relevant data analyses and computational models. The topic of the research project that we will use as an example combines cognitive neuroscience in birds with neuropsychiatric models in rodents and computational neuroscience. The classes will be a mix of group discussions, seminar-style presentations, lab visits, as well as lectures and exercises on modern research methods from the different fields.

SEMINAR

INTRODUCTION TO HUSSERL'S PHENOMENOLOGY (030063)

FRANCESCA RIGHETTI, M.A.

TERM:	Winter 2023/24
MEETING TIME:	Monday, 12 – 14 (first meeting: 09.10.2023)
ROOM:	GA 04/187
CP:	3 or 6

Phenomenology is a historical movement of philosophy that aimed to provide the proper foundation for philosophy and sciences. Its founder, Edmund Husserl, started the debate on the distinct methodology and characterization of such philosophical endeavour. In response to the scientific project of building upon theories and data to contribute to empirical knowledge, the Husserlian project aimed to step back and investigate the nature of knowledge through the methodology of “going back to the things themselves”, or, in other words, to subjective experiences.

Nowadays, Husserlian phenomenology and analysis contribute to the philosophical

debate as the discipline that studies the structure of subjective experience and consciousness. Through the basic understanding of consciousness, phenomenology has contributed to understanding experiences, such as perception, thought, memory, imagination, emotion, bodily awareness, embodied action, and social activity.

In this seminar, we will cover the historical background of the emergence of phenomenology and how the critical concepts elaborated by Edmund Husserl from early to late writings can still contribute to the philosophical debate. Readings from *Cartesian Meditations: an Introduction to Phenomenology* will be provided as complementary to explore the basic notions and phenomenological method.

Aside from active participation, participants will be expected to present in English.

Assistance regarding the English language will be provided. The original Husserlian text will be provided both in German and in English.

Literature:

Husserl, E. (1991). *Cartesianische Meditationen und Pariser Vorträge*. (Vol. I, *Husserliana*), Den Haag: Nijhoff.

Husserl, E. (1960). *Cartesian Meditations: an introduction to Phenomenology*. Transl. Dorion Cairns, Martinus Nijhoff Publishers: The Hague.

Moran, D. (2000). *Introduction to Phenomenology*, Routledge: London.

Zahavi, D. (2003). *Husserl's Phenomenology*. Stanford University Press: Stanford, California.

*LECTURE***LEFT BRAIN - RIGHT BRAIN (118111)**

PROF. DR. PHIL. DR. H.C. ONUR GÜNTÜRKÜN

TERM:	Winter 2023/24
MEETING TIME:	Tuesday, 14 – 16 (First Meeting: 17.10.2023)
ROOM:	HIA
CP:	3

Most of our brain's processes are executed by different mechanisms in the left and the right hemisphere. Language, spatial orientation, motor control, emotional processing, face perception, and even the ability to comprehend the rhythm of a drum are guided by neural circuits that are differently tuned within the two hemispheres. These asymmetries of mental processing mean that damages of the human brain cannot be understood without a thorough understanding of asymmetries. The lecture aims at explaining the current knowledge about the structure and the mechanisms of cerebral asymmetries by making use of highly interactive teaching methods.

SEMINAR

AGENT-BASED SIMULATIONS IN PHILOSOPHY (030061)

PROF. DR. DUNJA ŠEŠELJA, PROF. DR. CHRISTIAN STRAßER

TERM:	Winter 2023/24
MEETING TIME:	Friday, 14 – 16 (exception 07.12. & 08.12.23: 10-18)
ROOM:	Wasserstr. 221/4
CP:	3 or 6

In recent years digital aspects have entered philosophy, both in terms of providing a plethora of new topics and by providing new perspectives on old questions. Moreover, the digital age also equips philosophy with new computational methods for tackling philosophical questions, such as computer simulations. This course is dedicated to this topic.

Computer simulations in the form of agent-based models (ABMs) have in recent years become a popular method in philosophy, particularly in social epistemology, philosophy of science and political philosophy. In this course we discuss some of the central philosophical questions studied by means of ABMs. For instance, can groups of rational agent polarize, if yes, under which conditions? Can groups composed of agents that reason individually fully rationally (e.g., according to Bayesian standards) still be inefficient as a group? If yes, how so? Other topics concern questions from social epistemology and philosophy of science, such as the division of cognitive labor, cognitive diversity and expertise, opinion dynamics, etc.

This course will consist of three parts:

1. In October and November we will cover some of the most prominent modeling frameworks used in the philosophical literature and beyond. The readings will be aimed at preparing students for talks by experts on the topic, which constitute part 2.
2. On the 7-8th of December, 2023 we will have a (full day) workshop in which experts working in this field will come to RUB and present their work. No further classes will take place in December. Instead, students will choose a topic related to one of the talks in the workshop and start their project on it. The topics for student projects will be agreed upon in (individual) online meetings. The project should result in a presentation and an essay.

Literature: The reading list will be provided during the course.

SEMINAR, ESSAY WRITING COURSE

SEEING-AS: PERCEPTION AND IMAGINATION FROM KANT TO ARTIFICIAL INTELLIGENCE (030111)

DR. ALFREDO VERNAZZANI

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 10 – 12 (First meeting: 12.10.2023)
ROOM:	GABF 04/354
CP:	3 or 6

This is an Essay Writing Course in Philosophy:

For all students who did not study philosophy during the BA program but need to learn how to write an essay or still feel insecure about it, we recommend in the winter semester the seminar of Dr. Alfredo Vernazzani.

This course can be used either in module C2 or in module AM1.

Consider the visual experience of seeing Jastrow's figure either as a duck or as a rabbit. As Wittgenstein famously remarked, nothing has changed in the picture, and yet everything seems to have changed when you stop seeing it as a duck, and see it as a rabbit instead. Seeing-as episodes stretch far beyond bistable pictures and include also episodes of face and expression perception, object recognition, sign perception, and so on. According to P.F. Strawson's influential Kantian account, imagination and concepts are involved in shaping our seeing-as experiences. In this seminar, we will explore the imagination's and visual imagery's contribution to visual perceptual experience. We will begin with some classical texts, starting from Aristotle's on phantasia, Hume, Kant's doctrine of schematism, Wittgenstein, and Strawson, and then review some contemporary philosophical and scientific accounts, including recent work in Artificial Intelligence.

Literature:

Reading suggestion:

P.F. Strawson (1974) "Imagination and Perception" in his *Freedom and Resentment and Other Essays* (pp. 50-72). New York: Routledge.

SEMINAR

PERPLEXITIES OF CONSCIOUSNESS (030090)

DR. FRANCOIS KAMMERER

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 12 – 14 (First meeting: 12.10.2023)
ROOM:	GABF 04/358
CP:	3 or 6

In this course, we will work through Eric Schwitzgebel's 2011 book: "Perplexities of Consciousness". The book draws on work in psychology and philosophy to argue that we know very little about our conscious experience – notably, because our capacity to introspect our own conscious experiences is deficient. Its main thesis is established through focusing on a set of provocative, concrete philosophical and scientific questions about ordinary conscious experience, such as: do we dream in colors, or in black and white? What exactly do we visually experience when we close our eyes? Do we have a permanent tactile conscious experience of our feet in our shoes even when we do not explicitly think about it? Etc.

Preliminary reference list:

Schwitzgebel, Eric (2011). *Perplexities of Consciousness*. Bradford.

*LECTURE***SITUATED COGNITION (030006)**

PROF. DR. TOBIAS SCHLICHT

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 12 – 14 (First meeting: 12.10.2023)
ROOM:	HGA 30
CP:	tba

Situated Cognition is an umbrella term for a family of views about cognition which breaks in various ways. That is, it rejects the sandwich model of cognition, according to which cognition is "sandwiched" in between perception and action, and it rejects the representational-computational theory of mind. Instead, it conceives of perception, cognition and action as dynamically entangled phenomena and of perception as an embodied activity of the whole organism in a complex physical and social environment. Consequently, brain, body and world must be taken into account in explanations of cognition. Situated cognition is also sometimes equated with 4E cognition, according to which cognition is embodied, embedded, enactive and sometimes extended. We will introduce all of these frameworks and conceptions in detail and add some historical detail. For example, we discuss how the contemporary enactivism with its central notion of autopoiesis has emerged from Kant's discussion of organisms in the Critique of the power of judgement and Hans Jonas' philosophy of the organism.

Literature: Andy Clark 2014: Mindware. 2nd ed. Oxford University Press.

*SEMINAR***MERLEAU-PONTY AND COGNITIVE SCIENCE (030103)**

DR. ELMARIE VENTER

TERM:	Winter 2023/24
MEETING TIME:	Monday, 10 – 12 (First meeting: 09.10.2023)
ROOM:	GA 03/46
CP:	3 or 6

This seminar will offer an exploration of Merleau-Ponty's contributions to the field of cognitive science. Merleau-Ponty's work is known for its emphasis on embodiment, perception, and the lived experience, and has had a profound impact on our understanding of the mind-body relationship. Throughout the seminar, we will delve into key concepts and examine his critique of traditional cognitive science that prioritizes disembodied and cognitivist models of cognition. We will thereby seek to understand the implications for rethinking cognitive science in terms of an embodied and enactive framework. We will analyze and critically examine the intersections between Merleau-Ponty's phenomenology and contemporary cognitive science research.

Literature: Literature will be provided on Moodle.

SEMINAR

IMAGINATION AND MENTAL IMAGES (030106)

PROF. DR. MARKUS WERNING

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 12 – 14 (First meeting: 12.10.2023)
ROOM:	GA 04/187
CP:	3 or 6

Join us for an engaging and thought-provoking seminar exploring the fascinating realm of imagination and mental images in philosophy. This seminar is specifically designed for philosophy and cognitive science students seeking to understand the nature and significance of imagination and its relation to mental imagery.

The seminar will commence by discussing the works of three influential phenomenologists: Husserl, Sartre, and Casey. Through a close examination of their writings, we will explore the role of imagination in shaping our perception of the world and its impact on our lived experiences. We will investigate the intricate connections between imagination, consciousness, and intentionality, unraveling the ways in which mental images contribute to our mental life.

Building upon the phenomenological foundations, we will then shift our focus to the analytic tradition. We will delve into the imagery debate and critically examine the arguments surrounding the nature and neuro-cognitive underpinnings of mental images. We will finally turn to examining the nature, semantics and epistemic value of imagining.

By the end of this seminar, participants will have gained a comprehensive understanding of the complex interplay between imagination and mental images within both phenomenological and analytic philosophies. They will have the tools to critically evaluate and contribute to ongoing debates surrounding the nature of mental imagery and its implications for our understanding of perception, cognition, and the mind. Students will also have the opportunity to link up with our DFG research group "Constructing Scenarios of the Past".

Aside from active participation, participants will be expected to give a presentation in English. Assistance regarding the English language will be provided. Teaching will be assisted by Sofia Pedrini.

Literature:

Abraham, A. (Hrsg.). (2020). *The Cambridge Handbook of the Imagination* (1. Aufl.). Cambridge University Press. <https://doi.org/10.1017/9781108580298>

Casey, E. S. (2000). *Imagining, Second Edition: A Phenomenological Study*. Indiana University Press.

- Dokic, J., & Arcangeli, M. (2015). The Heterogeneity of Experiential Imagination. *Open MIND*. <https://doi.org/10.15502/9783958570085>
- Husserl, E., Brough, J. B., & Husserl, E. (2005). *Phantasy, image consciousness, and memory, 1898-1925*. Springer.
- Kind, A. (Hrsg.). (2017). *The Routledge handbook of philosophy of imagination* (First issued in paperback). Routledge.
- Kosslyn, S. M. (1994). *Image and Brain*. MIT Press.
- Langland-Hassan, P. (2020). *Explaining imagination* (First edition). Oxford university press.
- Liefke, K., & Werning, M. (2021). Experiential Imagination and the Inside/Outside-Distinction. *New Frontiers in Artificial Intelligence, LNCS 12758*, 96–112. https://doi.org/10.1007/978-3-030-79942-7_7
- Merleau-Ponty, M. (2013). *Phenomenology of Perception* (0 Aufl.). Routledge. <https://doi.org/10.4324/9780203720714>
- Sartre, J.-P., Elkaim-Sartre, A., & Webber, J. (2004). *The imaginary: A phenomenological psychology of the imagination*. Routledge.
- Tye, M. (1991). *The Imagery Debate*. MIT Press.
- Werning, M. (2020). Predicting the Past from Minimal Traces: Episodic Memory and its Distinction from Imagination and Preservation. *Review of Philosophy and Psychology*, *11*, 301–333. <https://doi.org/10.1007/s13164-020-00471-z>

SEMINAR

ANIMAL CONSCIOUSNESS (030092)

DR. FRANÇOIS KAMMERER

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 14 – 16 (First meeting: 12.10.2023)
ROOM:	GABF 04/609
CP:	3 or 6

Are non-human animals conscious – and which ones? – apes, dogs, birds, fish, bees, crabs? For those who are conscious, how do they experience the world? – and how can we know this, since it seems that we cannot ask them directly, and given that competing theories of consciousness abound and give different verdicts about what is required for consciousness? This question is difficult, and yet it seems extremely important, both from a theoretical point of view, and to determine the moral status of animals. In this course, we will approach the question of animal consciousness, mainly through Michael Tye's 2017 book "Tense Bees and Shell-Shocked Crabs".

Preliminary reference list:

Tye, Michael (2016). Tense Bees and Shell-Shocked Crabs: Are Animals Conscious? Oxford University Press

*LECTURE & EXERCISE (+TUTORIAL)***ARTIFICIAL NEURAL NETWORKS (212006)**

PROF. DR. SEN CHENG

TERM:	Winter 2023/24
LECTURE:	Monday, 16 – 18 (First meeting: 09.10.2023)
ROOM:	HNC 30
TUTORIAL:	Wednesday, 10 – 12 (First meeting: 11.10.2023)
ROOM:	IA 0/158-79 (PC-Pool 1)
EXERCISE:	Friday, 10 – 12 (First meeting: 11.10.2023)
ROOM:	NC 6/99
CP:	6

This course can be used either for module BM3 or for module C2.

This course needs quite some math preparation including calculus, linear algebra, statistics and programming.

Artificial neural networks (ANN) were inspired by the architecture and function of the brain. Nevertheless, their greatest strength is not that they are good models of the brain, but rather that they are powerful function approximators. Since the 1980's many types of ANN have been developed and tricks for training ANNs on data proliferated. Recent advances in computing hardware and the availability of large datasets have made it possible to train ANNs such that they perform better than humans, e.g. on image recognition. In this class, students will, firstly, gain a theoretical understanding of the principles underlying the methods applied to neural networks and, secondly, learn practical skills in implementing neural networks and applying them for data analysis.

Topics: optimization problems, regression, logistic regression, biological neural networks, model selection, universal approximation theorem, perceptron, MLP, backpropagation, deep neural networks, recurrent neural networks, LSTM, Hopfield network, Boltzmann machine

Software: python, numpy, scipy, matplotlib, scikit-learn, tensorflow

There will be a written examination at the end of the course.

Prerequisites: Calculus, linear algebra, statistics, programming.

Registration: Please register via moodle: <https://moodle.ruhr-uni-bochum.de/m/course/view.php?id=>

*ONE-WEEK PRACTICAL COURSE***AUTONOMOUS ROBOTICS (212401)**

PROF. DR. RER. NAT. GREGOR SCHÖNER

TERM:	Winter 2023/24
MEETING TIME:	Preliminary Meeting: 22.02.2024 10.00 – 11.00; room NB 02/77 Block: 26.02.24 – 01.03.24, 10 - 18
ROOM:	NB 02/77
CP:	3

This course can be used either in module C2 or in module I3.

The practical course gives an introduction to mobile robotics with a focus on dynamical systems approaches. The open-source simulation environment Webots is used to control e-puck miniature mobile robots, equipped with a differential drive, combined infrared/proximity sensors and a video camera. The course covers elementary problems in robot odometry, use of sensors and motor control. It then teaches basic dynamic methods for robot navigation, in which the robot's sensors are used for obstacle avoidance and approach to a target location.

The practical part of the lab course consists of a week of full-time work in which students solve programming tasks with simulated mobile robots. The students then write reports in which they describe and analyze the work they have done. The grade for the lab course is based on both the practical work and the report. Students will get support during programming.

Registration: Via E-Learning (registration period: 02.10.23 – 10.11.23)

<https://www.ini.rub.de/elearning/?eid=425>

*BLOCK SEMINAR, ESSAY WRITING COURSE***SHORT FORMAT SCIENTIFIC COMMUNICATION (112916)**

DR. LUKAS HAHN [PROF. DR. JONAS ROSE]

TERM:	Winter 2023/24
MEETING TIME:	Preliminary meeting: date tba Block Group 1: 07. + 08.02.24 & 26. + 27.02.24, 13 - 17 Block Group 2: 07. + 08.02.24 & 28. + 29.02.24, 13 - 17
ROOM:	GA 04/187
CP:	3

This is an Essay Writing Course in Psychology:

For all students who would like to intensify their knowledge in scientific writing, for example as preparation for further essays or theses, we recommend the class by Dr. Lukas Hahn.

This course can be used either in module C2 or in module C3.

Effective writing is one of the most important skills in today's science, engineering, and business landscapes. Effectively communicating the value of your research can make the difference between if they are funded and accepted for publication or not.

What research means to scientific experts in the field vs. a broad public audience requires very different communication approaches. Communicating the value of research is a critical skill that will enable you to apply these skills from an early stage of your career.

During the science writing course, a combination of seminars that encourage group discussion will explore current topics at the cutting edge of research in working memory and visual neuroscience. Assessments designed to replicate the requirements of academia will help you hone the skills learned to become an effective scientific writer.

Registration is limited to 10 students.

SEMINAR

DISKURS NEUROPSYCHOLOGIE: WHAT IS A MEMORY REPRESENTATION? (118613)

DR. MARKUS WERKLE-BERGER

TERM:	Winter 2023/24
MEETING TIME:	Preliminary Meeting: 11.10.2023, 10.00 meeting time is announced in the preliminary meeting
ROOM:	Online via webex
CP:	3

What is a memory representation? In 1904, Richard Semon introduced the term "engram" to describe the neural substrate for storing memories in the brain. According to this view, an experience engages a subset of cells that undergo off-line, persistent chemical and/or physical changes to form a long-lasting representation of this experience. Reactivation of the very same set of neurons is supposed to induce memory retrieval. Semon's contributions were largely ignored during his lifetime. However, new technological and methodological advances allow the study of memory representations with an unprecedented level of detail? However, it is still debated what exactly constitutes a memory representation, how they allow the formation of large sets of interconnected knowledge, how the brain solves the stability-plasticity trade-off, and how memory representations actually guide adaptive behavior in an ever-changing environment. The present discourse will target the core question by discussing seminal ideas about how memories are formed, maintained and potentially forgotten in neural networks, like the human brain. The literature based work will be accompanied by discussions of talks delivered by leading experts in the field.

SEMINAR

THE NEUROSCIENCE OF MEMORY AND ATTENTION (119221)

MELINDA SABO, MSC [PROF. DR. JONAS ROSE]

TERM:	Winter 2023/24
MEETING TIME:	Friday, 12 – 14
ROOM:	IA 1/87
CP:	3

The current seminar will cover ongoing debates and theories related to the neuroscience of human memory (both working memory and episodic memory) and attention, based on a pre-selected set of papers. Some of these topics include:

- Endel Tulving's theory of episodic memory;
- The Attention to Memory model and its implications;
- Ongoing debates around attentional processes and episodic memory;
- Attentional selection and working memory & its neural correlates;
- The relationship between attention, working memory, and long-term memory.

The aim of the seminar will be two-fold: beyond gaining a basic understanding of these topics, I also aim to introduce and teach a set of reading techniques (e.g., keeping a reading journal), which will help with reading scientific literature faster and more efficiently. Consequently, the current seminar aims to also train student's reading skills, which is a highly important skill for writing the master thesis. In the first sessions, I will demonstrate how to create and keep a reading journal. During the following seminars, this technique will be practiced while reading the indicated papers (the active reading part will be done during the seminar). Each seminar will have the following format: a brief theoretical input from my side on the topic of the selected paper; active reading time, during which students go through one or two papers and fill in the entries of their reading journal; finally, at the end of each seminar students will have the chance to ask questions and we will reflect on the reading experience. The final assignment will be to create a mindmap on one of the discussed subtopics. The mindmap will be based on the notes taken during the semester in the reading journal. Grades will be based on the final mindmap. Since the class is based on active work during each session, regular attendance will be part of the requirements.

Requirements: An introductory course in cognitive psychology would be helpful, but it is not a mandatory requirement.

*BLOCK SEMINAR, ESSAY WRITING COURSE***SHORT FORMAT SCIENTIFIC COMMUNICATION (112916)**

DR. LUKAS HAHN [PROF. DR. JONAS ROSE]

TERM:	Winter 2023/24
MEETING TIME:	Preliminary meeting: date tba Block Group 1: 07. + 08.02.24 & 26. + 27.02.24, 13 - 17 Block Group 2: 07. + 08.02.24 & 28. + 29.02.24, 13 - 17
ROOM:	GA 04/187
CP:	3

This is an Essay Writing Course in Psychology:

For all students who would like to intensify their knowledge in scientific writing, for example as preparation for further essays or theses, we recommend the class by Dr. Lukas Hahn.

This course can be used either in module C2 or in module C3.

Effective writing is one of the most important skills in today's science, engineering, and business landscapes. Effectively communicating the value of your research can make the difference between if they are funded and accepted for publication or not.

What research means to scientific experts in the field vs. a broad public audience requires very different communication approaches. Communicating the value of research is a critical skill that will enable you to apply these skills from an early stage of your career.

During the science writing course, a combination of seminars that encourage group discussion will explore current topics at the cutting edge of research in working memory and visual neuroscience. Assessments designed to replicate the requirements of academia will help you hone the skills learned to become an effective scientific writer.

Registration is limited to 10 students.

C3

Memory & Learning

*BLOCK SEMINAR***WORKING MEMORY AND COGNITIVE CONTROL (118921)**

JUAN MEDINA PESCHKEN, M.SC. [PROF. DR. JONAS ROSE]

TERM:	Winter 2023/24
MEETING TIME:	Preliminary Meeting: 19.02.2024 (Zoom) 04.03.2024 - 08.03.2024
ROOM:	GA 04/187
CP:	3

This course will cover Working Memory and Cognitive Control from different viewpoints. The students will learn theoretical concepts of both and learn to distinguish working memory from other memory models. One

emphasis of the course is the neuronal basis of these concepts. We will talk about measurement techniques and experimental design. There will be a practical exercise in experimental design as well. A second focus will be the comparison of working memory and cognitive control between birds and mammals. We will also discuss current research papers in those areas, which will be presented by the students.

C3

C3. Memory, Learning & Decision Making

*SEMINAR***DISCOURSE NEURAL BASIS OF LEARNING (118665)**

PROF. DR. JONAS ROSE, JUAN MEDINA PESCHKEN, MSC

TERM:	Winter 2023/24
MEETING TIME:	Monday, 9 - 10 (First Meeting: 16.10.2023)
ROOM:	GA 04/187
CP:	3

Current literature in cognitive neuroscience will be presented and discussed in depth. We aim to follow up on novel approaches, interesting angles and to have a critical discussion of research methods and interpretations.

Maximum number of participating students: 10

*SEMINAR***HOW DO WE UNDERSTAND OURSELVES? THE SELF IN MEMORY AND SOCIAL COGNITION (INCLUDING INTERACTION WITH AI SYSTEMS) (030116)**

PROF. DR. ALBERT NEWEN, DR. LEDA BERIO

TERM:	Winter 2023/24
MEETING TIME:	Monday, 16 – 18 (First meeting: 09.10.2023)
ROOM:	GA 04/187
CP:	3 or 6

The seminar will be completely held in English. It has three parts: In the first part, we read and discuss theories of self and self-consciousness including Daniel Dennett's theory of the narrative self, Thomas Metzinger's no-self theory and the pattern theory of self (Shaun Gallagher; Albert Newen). In the second part the focus will shift to the role of narrative self in memory. Central questions are: how is the self shaped by our memories of past events, on the one hand, and how is self influencing how I recall a past episode, on the other hand? We need to discuss recent theories of self-memory-systems, also inspired by psychological theories. In the third part we will discuss the relation between self-understanding and understanding others. Thus, we will discuss theories of how we understand other human beings (Simulation Theory, Theory Theory, Interaction Theory; Person Model Theory). This is the background to read recent articles about the question to which degree our strategies of understanding others is not only used in the case of understanding human interaction partners but also to understand the behavior of AI systems.

Students from Bochum meet in the Bochum lecture room. Student in Dortmund can meet there (or receive special instructions by Katja Crone). We are all connected via Zoom for joint discussions.

Literature: The literature will be announced in the first session. As a preparation the students can read Dennett's theory of the narrative self. A link to the text will be provided here:

<https://www.pe.ruhr-uni-bochum.de/philosophie/ii/newen/lehre.html.de>

C3

Memory & Learning

*SEMINAR***JOURNAL CLUB: LEARNING AND MEMORY (212103)**

PROF. DR. SEN CHENG

TERM:	Winter 2023/24
MEETING TIME	Tuesday, 14 – 16 (First Meeting: 10.10.2023)
ROOM:	NB 3/72
CP:	3

We will focus on the neural basis of learning and memory at the systems level. In each (online) session a journal article will be presented by one participant and discussed by all participants. The articles will be selected particularly in the areas of spatial and episodic memory. They will focus on the functional role of the mammalian hippocampus in these processes and include a diverse set of approaches: electrophysiology, imaging, computational modeling, and robotics.

Contact: Prof. Dr. Sen Cheng, NB 3/33, sen.cheng@rub.de

Office hours: Thursdays 14:00-15:00 (Cheng)

Capacity: max. 15 students

Enrollment: ecampus

SEMINAR

ALGORITHMS FOR DECISION MAKING (212130)

PROF. DR. ROBERT SCHMIDT

TERM:	Winter 2023/24
MEETING TIME:	Monday, 14 – 16 (First meeting: 09.10.2023)
ROOM:	IC 03/449
CP:	3

Automated decision-making systems are used for many important problems in engineering (e.g. automated driving), medicine (e.g. cancer screening), economics (e.g. portfolio allocation), environmental science (wildfire surveillance), and space travel (e.g. Mars exploration). In their recent book [1], Kochenderfer et al. examine different decision-making algorithms from a computational perspective, with a focus on the problem of uncertainty. Uncertainty can be represented using probability distributions and can occur on different levels, such as uncertainty about the outcome of actions or about the underlying world model.

Overall, the different parts of the book cover Probabilistic Reasoning, Sequential Problems, Model Uncertainty, State Uncertainty, and Multiagent Systems. Each part of the book contains then several chapters with a more specific topic describing mathematical problem formulations and computational approaches, often closely related to reinforcement learning and planning.

Each student will cover the topic from a book chapter in a presentation in the seminar, followed by a discussion of the topic with active participation from the whole seminar group.

Learning Outcomes:

- Knowledge on different algorithms and computational approaches for decision making
- Explain the underlying mathematical problem formulations and the implementation of the algorithms to solve them
- Insight into different types of uncertainty and the balancing of multiple objectives
- Discuss practical applications of the theoretical frameworks
- Present the algorithms and mathematical problem formulations to an audience

Examination: Oral presentation

Requirements: Knowledge of calculus, linear algebra, and probability concepts. Background in artificial intelligence, e.g. via the course "Introduction to Artificial Intelligence".

Registration: If you would like to attend the class, please write an E-Mail to Professor Schmidt (robert.schmidt@rub.de) including your matriculation number and the Master program.

Literature:

Kochenderfer, M. J., Wheeler, T. A., & Wray, K. H. (2022). Algorithms for decision making. MIT press. <https://algorithmsbook.com/files/dm.pdf>

SEMINAR

LINGUISTIC RELATIVITY: THE INFLUENCE OF LANGUAGE ON THOUGHT (030112)

PROF. DR. MARKUS WERNING

TERM:	Winter 2023/24
MEETING TIME:	Tuesday, 16 – 18 (First Meeting: 10.10.2023)
ROOM:	GA 04/187
CP:	3 or 6

Since Edward Sapir and Benjamin Whorf formulated their famous hypothesis that the grammar of a person's native language determines the structure of her thought, linguistic relativity has been a major topic in the philosophy of mind and language, linguistics and cognitive science. Numerous studies have investigated in how far the vocabulary and syntax of a language influence people's ontology, the way they categorize objects and properties and how they think about time, space and causality.

Philosophers have contributed to that debate by arguing for and against the indeterminacy of translation, ontological relativity, or the priority of language over thought. In the seminar we will review those arguments and evaluate them in the light of recent empirical studies.

Aside from active participation, participants will be expected to give a presentation in English. Assistance regarding the English language will be provided.

Readings:

- Berlin, B., & Kay, P. (1969). *Basic color terms: Their universality and evolution*. Berkeley, California: University of California Press.
- Carey, S. (2001). Whorf vs. continuity theorists: Bringing data to bear on the debate. In M. Bowerman & S. Levinson (Eds.), *Language acquisition and conceptual development*. Cambridge: Cambridge University Press.
- Davidson, D. (2001). *Inquiries into Truth and Interpretation*. Oxford: Oxford University Press.
- Kay, P., & Regier, T. (2003). Resolving the question of color naming universals. *Proceedings of the National Academy of Sciences (USA)*, 100, 9085-9.
- Li, P., & Gleitman, L. (2002). Turning the tables: language and spatial reasoning. *Cognition*, 83(3), 265-94.
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SEMINAR

INTRODUCTION TO DEONTIC LOGIC: CHALLENGES, PARADOXES, AND FORMAL SYSTEMS (030058)

PROF. DR. CHRISTIAN STRÄBER, CORNELIS VAN BERKEL

TERM:	Winter 2023/24
MEETING TIME:	Wednesday, 10 – 12 (First Meeting: 11.10.2023)
ROOM:	GABF 04/609
CP:	3 or 6

In this course, students will acquire theoretical knowledge of the state of the art on logical formalisms for reasoning about normative concepts and normative systems. Deontic Logic is the overarching term for the field of formal logic that deals with normative concepts such as obligation, permission, prohibition, and norms. The field has been driven by challenging problems referred to as deontic paradoxes. More recently, interest in deontic logic in Artificial Intelligence (AI) has increased due to novel challenges that concern reasoning with norms in intelligent systems. Deontic logics are most often modal logics but challenges concerning norm conflicts have led to the introduction of alternative formalisms. Some of these challenges concern reasoning about agents' duties after they violate their initial duty and about what agents ought to do when conflicts between norms arise.

During the course, we will study three themes:

1. Philosophical motivations, such as the notorious deontic paradoxes;
2. Formal systems (both modal and alternative approaches);
3. Applications (the analysis of metaethical principles).

During the first weeks of the course, we decide on which of these aspects we zoom during the seminar.

Learning outcomes:

After successful completion of the course, students will obtain skills in formalizing deontic scenarios, proving (basic) logic statements, and critically evaluating theories. Furthermore, students will be able to understand and explain the most central challenges in the field (e.g., the notorious deontic paradoxes), the main deontic formalisms, and applications to ethics (e.g., metaethical principles).

Recommended background: Throughout the course, we introduce basic concepts and methods in logic needed for the discussed formalisms. Knowledge of classical propositional logic is required. Familiarity with modal logic and first-order logic is helpful but not required.

The course is a seminar. The lectures will be interactive, containing presentations and in-class exercises.

Literature:

We work partially from the textbook: Parent, Xavier and van der Torre, Leon (2018). Introduction to deontic logic and normative systems. College Publications. It can be accessed for free at: <https://www.collegepublications.co.uk/TLR/?00001>

For additional material and discussion of deontic paradoxes, we will make use of certain chapters in the handbook of deontic logic in computer science (2018). The handbook can also be accessed for free at: <https://collegepublications.co.uk/handbooks/?00001>

SEMINAR

INTUITIONISTIC LOGIC (030115)

DR. SATORU NIKI

TERM:	Winter 2023/24
MEETING TIME:	Monday 14-16 (First Meeting: 09.10.2023)
ROOM:	GABF 04/609
CP:	6

When somebody makes a claim, it is often accompanied by evidence for the claim. The philosophy of intuitionism (or constructivism) takes the notion of evidence to be central to logic: a valid inference must provide a recipe for constructing its evidence. This requirement leads to the rejection of the law of excluded middle, e.g. 'either there is extraterrestrial life or there is not.', because it may not come with evidence for one of the possibilities. Constructive reasoning therefore motivates a non-classical notion of logic, different from the one of classical logic as given by truth tables.

This course offers an introduction to intuitionistic logic, which formalizes constructive reasoning and has a wide range of applications in philosophy, mathematics and computer science. The contents to be covered include philosophical backgrounds for intuitionism, both proof systems and semantics for intuitionistic logic, and some fundamental theoretical results. There will be a focus on comparisons with classical logic, which will illustrate the difference between the two world views.

Literature:

Hiroakira Ono (2019), Proof Theory and Algebra in Logic. Springer.

Dirk van Dalen (2013), Logic and Structure. 5th edition. Springer.

SEMINAR

ATTITUDES TOWARDS OBJECTS (030084)

JUN.PROF. DR. KRISTINA LIEFKE

TERM:	Winter 2023/24
MEETING TIME:	Monday, 14 – 16 (First Meeting: 09.10.2023)
ROOM:	GA 04/187
CP:	3 or 6

It is often assumed that all mental states (e.g. believing, wishing, fearing) are relations to propositions. These propositions carry information content (e.g. '311 is a prime number') that can be true or false, that can be linguistically expressed by a sentence, and that can be shared between cognitive agents. Much recent work in the philosophy of language and mind has argued against this 'propositional attitude' view. This work has pointed out that the objects of many mental states (e.g. fearing Moriarty, imagining a unicorn, and needing a laptop) intuitively resist a propositional treatment. Thus, I can fear Moriarty without fearing that Moriarty has (or does) P (where P is some property or activity).

This seminar gives an introduction to the 'hot' topic of non-propositional attitudes. It identifies the theoretical challenges that are posed by these attitudes and reviews some attempts at solving these challenges. Over the course of the semester, students will learn about propositional and objectual attitudes, intentionality, referential opacity, and the metaphysics of attitudinal objects like beliefs and needs.

Examination: Students can receive 3 CP for giving a presentation or 6 CP for giving a presentation and writing an essay or passing an oral exam.

Selected readings:

Forbes, Graeme (2000). Objectual attitudes. *Linguistics and Philosophy* 23(2): 141-183.

Grzankowski, Alex (2013). Non-propositional attitudes. *Philosophy Compass* 8(12): 1123-1136.

Moltmann, Friederike (2003). Propositional attitudes without propositions. *Synthese* 135: 77-118.

Montague, Michelle (2007). Against propositionalism. *No  s* 41(3): 503-518.

Quine, Willard Van Orman (1956). Quantifiers and propositional attitudes. *Journal of Philosophy* 53(5): 177-187.

SEMINAR

GÖDEL: THE UNPROVABILITY OF THE CONSISTENCY OF ARITHMETIC (030094)

PD DR. NILS KÜRBIS, DR. DANIEL SKURT

TERM:	Winter 2023/24
MEETING TIME:	Wednesday, 14 – 16 (First Meeting: 11.10.2023)
ROOM:	GABF 04/358
CP:	6

It is recommended to attend the [exercise](#) (030095) in addition to the seminar. The exercise belongs to module AM2. Both classes are credited with 6 CP each and graded individually.

Gödel's first incompleteness theorem proved that if arithmetic is (ω) consistent, then it is not negation complete, that is, there is a sentence such that neither it nor its negation is provable in arithmetic. Gödel established this result by exhibiting a sentence of arithmetic, the so-called Gödel sentence, that is equivalent to the statement of its own unprovability in arithmetic. The second incompleteness theorem showed that if arithmetic is consistent, then it cannot prove the statement that expresses the consistency of arithmetic.

This course is an introduction to all formal aspects of Gödel's incompleteness theorems. We will begin with a recapitulation of fundamental results about first order logic, such as its completeness and the Löwenheim Skolem Theorem, and proceed to first order theories, in particular a fragment of number theory. Gödel's method of the arithmetisation of syntax and its application to the formalisation of proofs in arithmetic will be presented in detail. We will then be ready to prove Gödel's first incompleteness theorem. Afterwards we will consider the resources needed to prove the second incompleteness theorem. There will also be time to discuss the philosophical importance of Gödel's results.

Literature:

George Boolos: The Logic of Provability (Cambridge University Press 1993)

Herbert B. Enderton: A Mathematical Introduction to Logic, 2nd edition (San Diego: Harcourt 2001)

Eliot Mendelson: An Introduction to Mathematical Logic, 6th edition (Boca Raton: CRC Press 2015)

AM. Advanced Methods

Advanced methods are usually studied in the second semester. Solely the "fMRI"-course is only offered during the winter term.

Further advanced methods can be found in the program from the last summer semester on our webpage: <https://philosophy-cognition.com/mcs/course-guides/>

There will again be a variety of courses in the upcoming summer semester.

AM1	AM1. Theory Formation and Conceptual Analysis
	SEMINAR, ESSAY WRITING COURSE SEEING-AS: PERCEPTION AND IMAGINATION FROM KANT TO ARTIFICIAL INTELLIGENCE (030111) DR. ALFREDO VERNAZZANI
TERM:	Winter 2023/24
MEETING TIME:	Thursday, 10 – 12 (First meeting: 12.10.2023)
ROOM:	GABF 04/354
CP:	3 or 6

This is an Essay Writing Course in Philosophy:

For all students who did not study philosophy during the BA program but need to learn how to write an essay or still feel insecure about it, we recommend in the winter semester the seminar of Dr. Alfredo Vernazzani.

This course can be used either in module C2 or in module AM1.

Consider the visual experience of seeing Jastrow's figure either as a duck or as a rabbit. As Wittgenstein famously remarked, nothing has changed in the picture, and yet everything seems to have changed when you stop seeing it as a duck, and see it as a rabbit instead. Seeing-as episodes stretch far beyond bistable pictures and include also episodes of face and expression perception, object recognition, sign perception, and so on. According to P.F. Strawson's influential Kantian account, imagination and concepts are involved in shaping our seeing-as experiences. In this seminar, we will explore the imagination's and visual imagery's contribution to visual perceptual experience. We will begin with some classical texts, starting from Aristotle's on phantasia, Hume, Kant's doctrine of schematism, Wittgenstein, and Strawson, and then review some contemporary philosophical and scientific accounts, including recent work in Artificial Intelligence.

Literature:

Reading suggestion:

P.F. Strawson (1974) "Imagination and Perception" in his *Freedom and Resentment and Other Essays* (pp. 50-72). New York: Routledge.

*BLOCK SEMINAR***ARGUMENTATION (030060)**

PROF. DR. DUNJA ŠEŠELJA, PROF. DR. CHRISTIAN STRAßER

TERM:	Winter 2023/24
MEETING TIME:	05. – 09.02.2024, 10 - 16
ROOM:	Wasserstr. 221/4
CP:	3 or 6

Philosophy and science are based on argumentation. Instead of just voicing opinions or stating beliefs, scholars give reasons and provide evidence for their conclusions. Argumentation is key when trying to find a consensus, or at least when identifying the roots of a disagreement. As such, it is central in many areas, from everyday life to political discourse. Needless to say, good argumentative skills are a necessary requirements for successful studies (in essay and thesis writing, for instance).

In this course we will survey different facets of argumentation theory. We start off with foundations (argument schemes such as the Toulmin scheme, fallacy theory, types of arguments, etc.) and proceed towards contemporary investigations (e.g.: computational argumentation; Bayesian and probabilistic argumentation; pragma-dialectics; reasoning and biases; etc.). Finally, we will look into practical applications of argumentation, for example, in the context of structured debating as well as in the context of online debates.

Literature: The reading list will be provided during the course.

*EXERCISE***GÖDEL: THE UNPROVABILITY OF THE CONSISTENCY OF ARITHMETIC (ÜBUNG) (030095)**

PD DR. NILS KÜRBIS, DR. DANIEL SKURT

TERM:	Winter 2023/24
MEETING TIME:	Tuesday, 16 – 18 (First Meeting: 10.10.2023)
ROOM:	GABF 04/358
CP:	6

The exercise accompanying the [seminar](#) (030094; module C4) is an integral part of the course in which understanding of concepts introduced in the lectures is furthered through exercises, which also complete the discussion of the topics of the lectures. It is warmly recommended to students to attend both parts of the course.

For participating in the exercise, it is required to also register for the seminar. Both classes are credited with 6 CP graded each.

SEMINAR

MOTIVATIONAL PROCESSES AS TARGETS FOR BIOLOGICAL PSYCHIATRY (112915)

PATRICK REINHARDT, MSC [PROF. DR. JONAS ROSE]

TERM:	Winter 2023/24
MEETING TIME:	Wednesday, 10 – 12 (First meeting: 18.10.2023)
ROOM:	IA 1/157
CP:	3

The aim of the course is to give participants an overview of different methods and research questions within the area of biological psychiatry. A special focus will be put on studies investigating motivational processes. As a first step neurobiological processes underlying motivation will be discussed. Afterwards students will present studies on changes in motivation, seen in psychiatric and neurological disorders. The course will mainly consist of presentations and discussions of human- and animal studies.

Contact: Patrick.reinhardt@rub.de

Requirements: basic knowledge of clinical Psychology

*LECTURE & EXERCISE***INTRODUCTION TO NEURAL DATA SCIENCE (212014)**

PROF. DR. ROBERT SCHMIDT

TERM:	Winter 2023/24
LECTURE:	Thursday, 10 – 12 (First Meeting: 12.10.2023)
ROOM:	IC 03/449
EXERCISE:	Thursday, 12 – 14 (First Meeting: 12.10.2023)
ROOM:	ID 03/121 (CIP-Pool 2)
CP:	6

This course can be used either in module AM4 or in module I3.

Rapid technological advances have recently opened up new possibilities in understanding how the brain works. In particular the number of neurons that can be simultaneously recorded has increased considerably to hundreds (and soon thousands!) of neurons. However, this has led to a big challenge on how to actually process and analyze the resulting big data sets. Solutions for these challenges are part of the new exciting research field of 'Neural Data Science'.

In this module you will learn how methods and approaches from data science and machine learning can be applied to study brain signals and the related cognitive functions. In the first part of the module we will focus on so-called spike trains, how they can be analyzed, visualized, and decoded. In the second part of the module we will look at continuous signals, in particular at neural oscillations. Finally, we will learn about and apply some advanced methods from machine learning, such as dimensionality reduction approaches, reinforcement learning, clustering, and computational statistics. In the lectures I will provide the relevant neurobiological background and explain the computational approaches, which will then be applied in the computer exercises using real neural data sets.

Requirements: Basic knowledge of calculus and linear algebra, programming in Python

Literature:

Nylen, E. L., & Wallisch, P. (2017). Neural Data Science: A Primer with MATLAB® and Python™. Academic Press.

TERM:	Winter 2023/24
MEETING TIME:	Block, 26.02. - 08.03.2024, 09 – 16
ROOM:	HGB 10
CP:	3

Language of instruction: German

Lernziele:

Nach dem Abschluss des Praktikums

- können die Studierende kleine Programme in der Programmiersprache Python entwerfen, implementieren und debuggen.
- Die Studierenden haben erste Erfahrung mit der Arbeit mit komplexen Programmbibliotheken für spezielle Aufgabenbereiche gesammelt. Sie können mit Dokumentation arbeiten und APIs selbstständig recherchieren.
- Die Studierenden können ihre Programme erklären und Rückfragen präzise beantworten.

Aufbau des Kurses:

In der ersten Woche sammeln die Studierenden intensive Erfahrung im Umgang mit der Programmiersprache Python. In der zweiten Woche vertiefen sie ihre Fertigkeiten durch die Bearbeitung angewandter Fragestellungen, die mit Hilfe von Programmbibliotheken adressiert werden.

Prüfung:

Der Kurs ist bestanden, wenn die Aufgaben gelöst wurden und die eigenständige Leistung in einem kurzen Prüfungsgespräch nachgewiesen wurde. Es besteht Anwesenheitspflicht.

Voraussetzungen: Grundlegende Kenntnisse im Programmieren (Python) sind vorausgesetzt.

AM5

AM5. Special Methods in Neuroscience/Genetics

*BLOCK SEMINAR***IMAGING GENETICS: POLYGENIC SCORES (118515)**

JAVIER SCHNEIDER PENATE

TERM:	Winter 2023/24
MEETING TIME:	Preparatory Meeting: 17.10.2023, 10- 12, Room IA 02/460 20.01. – 21.01.2024, 9 - 18
ROOM:	GABF 04/511
CP:	3

Aim of the seminar is to give the participants an insight into the analysis of genome wide data in humans. The block seminar consists of two parts:

- 1) Presentations about a selection of studies investigating “GWAS” and “polygenic scores”.
- 2) Training in preprocessing and analysis of genotyped data sets using specialized bioinformatic software (“PLINK”, PRSice 2”) in order to calculate polygenic scores is. Afterwards, all newly acquired skills and knowledge will be put into practice by delving analytically into a research question that tests the link between polygenic scores and MRI-based morphometric- and/or connectivity measures of the brain.

This course is solely offered in English. All the necessary material will be provided.

AM5

AM5. Special Methods in Neuroscience/Genetics

*SEMINAR***INTRODUCTION TO SINGLE-CELL RECORDINGS (112617)**

DR. ROLAND PUSCH, CELIL SEMIH SEVINCİK, M.SC.

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 10 - 12
ROOM:	IA 02/460
CP:	3

In this seminar we will give an overview of the neurophysiological processes underlying spike trains. We will start with the biological basics of spike generation and the electrical activity accompanying neural communication. After setting up the theoretical framework, we will have hands-on sessions both for data acquisition and spike sorting. To get credit points, students need to present a scientific article.

Literature: Literature will be announced at the beginning of the seminar

SEMINAR

DISCOURSE NEUROPSYCHOLOGY (118611)

[DISKURS NEUROPSYCHOLOGIE]

ENSIYEH GHASEMIAN SHIRVAN, M.SC.

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 10 – 12 (First Meeting: 19.10.2023)
ROOM:	IA 1/169
CP:	3

Brain stimulation techniques, physiological investigations to clinical application

Brain stimulation techniques, Physiological investigations to clinical application: The application of non-invasive brain stimulation (NIBS) techniques has broadened our understanding of brain-behavior relationships. These methods have the capacity to modulate neural processes in the brain non-invasively and safely. Therefore, they enable researchers to directly study how experimentally altered neural activity causally affects behaviour, and how to use their therapeutic potential for patients with disorders, such as depression or schizophrenia. In this seminar, we will focus on the neural mechanisms behind NIBS, with a special focus on transcranial direct current stimulation (tDCS) and transcranial magnetic stimulation (TMS). We will review and discuss literature on NIBS techniques, ranging from basic research to clinical application.

SEMINAR

**BILDGEBENDE VERFAHREN IN DER NEUROPSYCHOLOGIE
(118513)**

DR. ANTOINE BOUYEURE, DR. CARLOS A. GOMES

TERM:	Winter 2023/24
MEETING TIME:	Wednesday, 12 – 14 (First Meeting: 11.10.2023)
ROOM:	IB 02/109 PC-Pool, or online
CP:	3

Language of instruction: German

In diesem Seminar sollen die für den/die Neuropsychologen/in relevante Bildgebende Verfahren vorgestellt werden. Hierbei werden sowohl die theoretischen Grundlagen, als auch die Methoden in der Versuchsplanung und Auswertung vorgestellt. Anhand von ausgewählten Arbeiten werden die Kenntnisse in Methode und Anwendung vertieft. Folgende bildgebende Verfahren, deren Anwendung und Auswertung werden vorgestellt: Positronen Emissions Tomographie (PET), Single Photonen Emissions Computer Tomographie (SPECT), Magnet Resonanz Tomographie/Funktionelle Magnet Resonanz Tomographie, Magnet Enzephalographie (MEG), Transkranielle Magnetstimulation (TMS). Statistical Parametric Maps (SPM). Es ist geplant, eine Auswertung eines Experimentes exemplarisch während des Seminars durchzuführen. Eventuelle praktische Sitzungen (MRT-Scans) sind je nach Terminplanung auch möglich. Ein zentrales Lernziel dieser Veranstaltung - und damit auch Grundlage für die erfolgreiche Teilnahme und Leistungsbewertung - ist die regelmäßige aktive Beteiligung am wissenschaftlichen Diskurs.

Remarks for AM7

Students who already have basic knowledge in cognitive neuroscience can choose to learn the "fMRI"-technique in the first semester. Necessary background: basic knowledge in cognitive neuroscience. The fMRI-seminar must be integrated into the course program during the first or the third semester; in case you want to learn the fMRI –technique in the first semester, an individual application for the course is necessary at Dr. Erhan Genç (erhan.genç@rub.de).

AM7	fMRI Training
	<i>SEMINAR & PRACTICAL COURSE</i> NEUROPSYCHOLOGICAL METHODS: fMRI (118518 & 118519) DR. ERHAN GENÇ
TERM:	Winter 2023/24
MEETING TIME:	Preparatory Meeting: 09.10.2023, 17.00 Monday 13.11., 20.11., 27.11., 04.12., 11.12.2023, 10 - 18
ROOM:	IB 02/109 (PC-Pool)
CP:	6

Practical course and seminar have to be attended both together. They cannot be taken individually.

Please also see remarks for AM7 above.

This seminar can only be taken in combination with the practical course. Participants must participate in both courses to get credit points: The aim of this course is to learn how magnetic resonance imaging can be used to acquire new scientific knowledge. Its main aim is to give the participants an insight into the evaluation and analysis of structural and functional MRI data and present their results in a scientific manner. The structural data are composed of high-resolution anatomical and diffusion-weighted measurements (DTI) which can be used to visualize the white matter fibre bundles. The functional data include common fMRI and resting state measurements to determine spontaneous brain activity. To pass this course, participants must be present on at least 2/3 of the seminar. The course is held regularly "in person" and includes visits to an MRI scanner where the brain scans of the course participants will be acquired. The date of these visits will be scheduled together with the course participants. This course is designed specifically for students of the cognitive science master program and due to the practical exercises, the number of participants is limited to 12.

After the subscription in eCampus where everyone is placed on the waiting list participants will be selected during the first meeting.

Please register online if interested.

D1. Free Selection

There is one free selection module in the program which can take any course of the program you passed and do not need to complete the modules. If there is a problem to complete a module, in principle, the courses in the free selection module can be used for obligatory modules. But this has to be explicitly confirmed in advance by the program coordinator or Prof. Dr. Jonas Rose. Students are only allowed to take up to 15 credit points in courses with German as language of instruction in the whole program.

D1

Free Selection

LECTURE

STRESS (117031)

PROF. DR. OLIVER T. WOLF, PROF. DR. CHRISTIAN MERZ

TERM:	Winter 2023/24
MEETING TIME:	Tuesday, 16 – 18 (First Meeting: 10.10.2023)
ROOM:	HZO 60
CP:	3

Language of instruction: German

Ursachen und Folgen von Stress werden aus einer psychologischen Perspektive beleuchtet. Es werden sowohl Aspekte der biopsychologischen Grundlagenforschung als auch Aspekte der anwendungsbezogenen Forschung (Gesundheitspsychologie, Klinische Psychologie, Wirtschaftspsychologie) berücksichtigt. Die Vorlesung gibt einen Überblick über aktuelle Forschungsthemen der Stressforschung. Folgende Fragen werden adressiert: Was ist Stress? Was ist ein Stressor? Welche psychischen und biologischen Veränderungen treten in Reaktion auf Stress auf? Wie kann man sich die große interindividuelle Varianz im Stresserleben erklären? Wann ist Stress adaptiv und unter welchen Umständen kann er negative Konsequenzen haben (maladaptiv sein)? Welche Auswirkungen hat Stress auf affektive und kognitive Prozesse? Wie wird unser Körper und unser Gehirn durch Stress beeinflusst? Neben psychologischen Ansätzen werden Theorien und Befunde aus den Forschungsfeldern der Psychoneuroendokrinologie und den affektiven und kognitiven Neurowissenschaften besprochen.

*LECTURE***LERNEN (112231)**

PROF. DR. PHIL. DR. H.C. ONUR GÜNTÜRKÜN

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 16 – 18 (First Meeting: 19.10.2023)
ROOM:	HIA
CP:	3

Language of instruction: German

Die Vorlesung soll einen Überblick über die Lerngesetze, ihre Anwendungsmöglichkeiten in therapeutischen Verfahren und die hirnpfysiologischen Grundlagen von Lern- und Gedächtnisprozessen bieten. Soweit möglich, sollen alle drei Aspekte immer zusammen besprochen werden; z.B. werden bei der klassischen Konditionierung zuerst die historischen Entwicklungslinien, dann die Details des eigentlichen Lernphänomens, dann die therapeutischen Anwendungen (z.B. systematische Desensibilisierung) und anschließend die synaptischen Mechanismen referiert.

Literatur: Als Vorbereitung ist folgendes Buch zu empfehlen:

The Principles of Learning and Behaviour, Michael Domjan, 7. Auflage, 2015

D1

Free Selection

*LECTURE***GRUNDLAGEN DER NEURO- UND SINNESPHYSIOLOGIE
(112241)**

PROF. DR. NIKOLAI AXMACHER

TERM:	Winter 2023/24
MEETING TIME:	Wednesday, 08.00 – 10.00 (First meeting: 18.10.2023)
ROOM:	HIA
CP:	3

Language of instruction: German

Ziel der Vorlesung ist es, ein Grundverständnis der Informationsverarbeitung im ZNS und der Sinnesorgane zu übermitteln. Neben den anatomischen Grundlagen im Aufbau von Nervenzellen werden auch das Verhalten, d.h. die Erregungsleitung und -übertragung, sowie die Verrechnungsprozesse an Synapsen näher betrachtet. Hierbei soll auch ein Schwerpunkt auf die synaptische Plastizität gelegt werden. Auch die in der Psychologie und Medizin eingesetzten diagnostischen Verfahren, wie z. B. das EEG, sollen erläutert werden.

*LECTURE***MOTIVATION UND VOLITION (112271)**

DR. RER. NAT. MARLIES PINNOW

TERM:	Winter 2023/24
MEETING TIME:	Monday, 16 – 18 (First meeting: 16.10.2023)
ROOM:	HIA
CP:	3

Language of instruction: German

Die Vorlesung führt in das Gebiet der Motivations- und Volitionspsychologie ein. In einem ersten Abschnitt wird in einem kurzen Überblick über die Forschungs- und Problemgeschichte, eine Gegenstandsbestimmung der Motivationspsychologie und ihrer zentralen Fragestellungen erarbeitet. Darüber hinaus werden zentrale Methoden der Motivationsforschung erörtert. Auf dieser Basis werden dann einzelne Verhaltenssysteme wie Hunger, Neugier, Angst, Leistung, Aggression diskutiert. Spezifische Ansätze wie Attributionstheorien, Erwartungs- X Wert-Modelle, Instrumentalitätstheorie etc. werden innerhalb der Motivsysteme oder als Exkurse behandelt. Den Abschluss bildet eine Erörterung handlungstheoretischer und volitionaler Probleme zielgerichteten Verhaltens.

The course will be held in German. Students may choose to take the exam in English. The recommended literature for those following this option is:

Heckhausen J. & Heckhausen, H. (2010). Motivation and Action. Cambridge: Cambridge University Press.

Literatur:

Schmalt, H.-D. & Langens, T. A. (2009): Motivation (4. vollständig überarbeitete Auflage). Stuttgart: Kohl-

hammer Heckhausen, J. & Heckhausen, H. (2010): Motivation und Handeln (4. Auflage). Berlin: Springer.

SEMINAR

STRESS UND KOGNITION (118032)

PROF. DR. CHRISTIAN MERZ

TERM:	Winter 2023/24
MEETING TIME:	Wednesday 12 – 14 (First Meeting: 18.10.2023)
ROOM:	IA 02/460
CP:	3

Language of instruction: German

Stress beeinflusst nicht nur unser Befinden, sondern auch die unterschiedlichsten kognitiven Prozesse. In dieser Veranstaltung werden eine Auswahl an kognitiven Prozessen besprochen, die sich unter dem Einfluss von Stress und Stresshormonen verändern, beispielsweise das deklarative Gedächtnis oder die Furchtkonditionierung. Hierbei werden humanexperimentelle Befunde in Form von Referaten dargestellt und diskutiert.

Literatur: Die Literatur für die Referate wird in der ersten Sitzung bekannt gegeben.

*SEMINAR***NEUROPSYCHOLOGISCHE REHABILITATION (118121)**

PROF. DR. BORIS SUCHAN

TERM:	Winter 2023/24
MEETING TIME:	Monday, 10 – 12 (First meeting 16.10.2023) Fr, 13.01.23 & 20.01.23, 9 - 17
ROOM:	IA 1/157
CP:	3

Language of instruction: German

In diesem Seminar sollen Möglichkeiten und Grenzen kognitiver neuropsychologischer Rehabilitation am Beispiel verschiedener neuropsychologischer Störungsbilder wie z.B. Schlaganfall, Demenz oder Multiple Sklerose aufgezeigt werden. Es werden aktuelle Konzepte und Inhalte neuropsychologischer Therapien bei Gedächtnis- Aufmerksamkeitsdefiziten etc. dargestellt. Ebenso werden psychotherapeutische Möglichkeiten zur Bewältigung psychologischer Folgen bei neurologischen Erkrankungen aufgezeigt und diskutiert.

Literatur: Eine Literatur ist zu Beginn des Seminars erhältlich

LECTURE

PSYCHOPHARMAKOLOGIE (112931)

PROF. DR. DIRK SCHEELE

TERM:	Winter 2023/24
MEETING TIME:	Friday, 08 – 10 (First meeting: 20.10.2023)
ROOM:	HIA
CP:	3

Language of instruction: German

In der Vorlesung „Psychopharmakologie“ werden die Grundlagen der Pharmakologie für Psycholog*innen und Psychotherapeut*innen vermittelt. Dabei werden die Themen Pharmakodynamik, Pharmakokinetik, Psychopharmaka und Pharmakotherapie behandelt. In der Vorlesung wird es beispielsweise um folgende Fragen gehen: Welche Klassen von Psychopharmaka gibt es und wann werden welche Psychopharmaka eingesetzt? Wie werden neue Psychopharmaka entwickelt und welche Innovationen gibt es in der psychopharmakologischen Behandlung psychischer Erkrankungen? Die Vermittlung der Psychopharmakologie erfolgt dabei immer in Bezug zu den biologischen Grundlagen psychischer Störungen und Symptome.

SECOND YEAR PROGRAM

I. Interdisciplinary Research Module

If a student wants to use a course from C1 to C4 as a substitute for I1 to I4, this is possible if the substitute course is closely connected with the master thesis project.

11	I1. Cognitive Philosophy
	<i>COLLOQUIUM</i> EXTRA RESEARCH COLLOQUIUM "METAPHILOSOPHY, EXPERIMENTAL PHILOSOPHY, AND ARGUMENTATION THEORY" (030128) JUN-PROF. DR. JOACHIM HORVATH
TERM:	Winter 2023/24
MEETING TIME:	Wednesday, 16.30 – 18.00 (First Meeting: 11.10.2023)
ROOM:	GAFO 04/619
CP:	3 or 6

In this colloquium in seminar-style, we will discuss current topics from argumentation theory, epistemology, experimental philosophy, and metaphilosophy, broadly construed. The colloquium will also host a number of talks by external guests, many of which are leading experts in their field. Students at the advanced bachelor, master, or doctoral level are especially welcome in the colloquium, and they can also acquire the normal range of credit points. Moreover, student participants will have the option of presenting their own work, e.g., related to their thesis, in English.

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I1. Cognitive Philosophy

COLLOQUIUM
RESEARCH COLLOQUIUM: RATIONALITY AND COGNITION
(030132)
JUN.PROF. DR PETER BRÖSSEL

TERM:	Winter 2023/24
MEETING TIME:	Monday, 14 – 16
ROOM:	GABF 04/709
CP:	3 or 6

In this seminar we study research articles (some of which will be work in progress) from the intersection of normative epistemology and descriptive epistemology (i.e., psychology and cognitive science). Among others, we investigate formal models of perception, rational reasoning and rational action. Acquaintance with formal methods in philosophy such as logic, set theory and probability theory will be presupposed. Students at the master or doctoral level will be given the opportunity to present their research in English.

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I1. Cognitive Philosophy

COLLOQUIUM
RESEARCH COLLOQUIUM "LOGIC AND EPISTEMOLOGY"
(030124)
PD DR. NILS KÜRBIS, DR. DANIEL SKURT

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 16 – 18 (First Meeting: 12.10.2023)
ROOM:	GABF 04/358
CP:	6

In this colloquium students will have an opportunity to present a paper on a topic of their choice from philosophical logic or epistemology. This paper may or may not be related to an MA thesis. Background knowledge in analytic epistemology and philosophical logic is required. In addition to presentations by students, there will be talks by guest and invited speakers.

*COLLOQUIUM***PHILOSOPHY MEETS COGNITIVE SCIENCE:
MEMORY AND LANGUAGE (030131)**

PROF. DR. MARKUS WERNING IN COOPERATION WITH THE
GERMAN LANGUAGE DEPARTMENT (RUB) AND THE CENTER FOR
PHILOSOPHY OF MEMORY (GRENOBLE)

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 16.15 – 18.30 (First Meeting: 13.10.2022)
ROOM:	GA 04/187
CP:	3 or 6

In the research colloquium current topics at the interface between Philosophy and Cognitive Science will be discussed. The colloquium hosts talks by leading international experts and local researchers as well as

presentations by doctoral and master students. Students will be given the (assisted) opportunity to present their projects in English.

This semester the sessions of the research colloquium will alternate in a bi-weekly rhythm between the topics "Memory" and "Language". A detailed schedule will be published in due course at

<https://www.ruhr-uni-bochum.de/phil-lang/colloquium.html>.

Talks will be held either online via Zoom or in person.

*COLLOQUIUM***INTERDISCIPLINARY READING CLUB: RECENT DEBATES ON SITUATED COGNITION (030127)**

PROF. DR. ALBERT NEWEN, DR. JULIA WOLF

TERM:	Winter 2023/24
MEETING TIME:	Tuesday, 14 – 16 (First Meeting: 10.10.2023)
ROOM:	GA 04/187
CP:	3 or 6

We will offer regular presentations half from PhD-students from Bochum and half from external guests. The presentations will all be in the general domain of theoretical philosophy and cognitive sciences focusing on 'Situated Cognition'. The presentations should ideally but not necessarily have some interdisciplinary dimension such that perspectives from philosophy, psychology, linguistics, and neurosciences can be systematically interconnected. The aim of the colloquium is to offer a platform for discussion of ongoing research in the RTG-group 'Situated Cognition' and further research projects on social understanding, the self, episodic memory, the perception-cognition divide.

Master students can receive standard CPs (ungraded certificate) for a presentation in the colloquium (in the case of an additional essay, Master students can receive standard CP and a graded certificate).

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Cognitive Philosophy

COLLOQUIUM

COLLOQUIUM: PHILOSOPHY OF LANGUAGE, LOGIC, AND INFORMATION (030120)

JUN.PROF. DR. KRISTINA LIEFKE, PROF. DR. DOLF RAMI

TERM:	Winter 2023/24
MEETING TIME:	Wednesday, 16 – 18 (First Meeting: 11.10.2023)
ROOM:	GA 04/187
CP:	3 or 6

This colloquium serves the discussion of current topics at the semantic interface of logic, the philosophy of language, and the philosophy of information. The colloquium will combine talks by international experts with presentations of local researchers and (PhD/MA) students. Students will be given the opportunity to present their (ongoing) work in English.

Students can receive 3 CP for giving a presentation or 6 CP for giving a presentation and writing an essay or passing an oral exam)

A detailed schedule will be available at:

<https://www.ruhr-uni-bochum.de/phil-inf/colloquium/index.html.en>.

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Cognitive Philosophy

COLLOQUIUM

COLLOQUIUM: PHILOSOPHY OF INFORMATION AND COMMUNICATION (030122)

JUN.PROF. DR. KRISTINA LIEFKE

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 16 – 18 (First Meeting: 12.10.2023)
ROOM:	GABF 04/354
CP:	3 or 6

This colloquium (co-organized with Prof. Daniel Gutzmann, Germanistik) serves the discussion of current topics in semantics, pragmatics, and the philosophy of language. The colloquium combines talks by international experts with presentations of local researchers and (PhD/MA) students. Students will be given the opportunity to present their (ongoing) work in English.

Students can receive 3 CP for giving a presentation or 6 CP for giving a presentation and writing an essay or passing an oral exam).

A detailed schedule will be available by mid-September at <https://www.ruhr-uni-bochum.de/phil-inf/colloquium/index.html.en>.

*COLLOQUIUM***SCIENTIFIC COLLOQUIUM: SOCIAL COGNITION (118113)****[FORSCHUNGSKOLLOQUIUM SOCIAL COGNITION]**

PROF. DR. HANS ALVES

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 16 – 18 (First Meeting: 19.10.2023)
ROOM:	IA 1/157
CP:	3

The colloquium features presentations by external and sometimes internal researchers on topics of social cognition. Example topics are attitudes formation, social perception, stereotypes and prejudices, judgment and decision making, etc. In addition, master students can present their research projects, e.g., in the context of their final thesis.

Students can receive 3 CP (graded or ungraded) for regular attendance and writing an essay.

*SEMINAR***JOURNAL CLUB: THEMA NEUROPSYCHOANALYSE
(118915)**PROF. DR. NIKOLAI AXMACHER,
PROF. DR. MED. HENRIK KESSLER

TERM:	Winter 2023/24
MEETING TIME:	Thursday, 16 – 18 (First Meeting: 12.10.2023)
ROOM:	IB 6/127
CP:	3

Language of instruction: German

In Analogie zu den Kognitiven Neurowissenschaften - der Untersuchung der neuronalen Korrelate kognitiver Prozesse - wurden in den letzten Jahren auch Konzepte der Psychoanalyse mit bildgebenden Methoden untersucht. Dieses Seminar vermittelt einen Überblick über diese Studien. Dabei werden aktuelle Untersuchungen zu zentralen psychoanalytischen Konzepten (Verdrängung, Konversion, Träume, Traumatisierung...), aber auch Studien zu den Mechanismen der psychodynamischen Psychotherapie sowie psychodynamische Konzeptualisierungen neuropsychologischer Symptome vorgestellt und diskutiert. Ein zentrales Lernziel dieser Veranstaltung - und damit auch Grundlage für die erfolgreiche Teilnahme und Leistungsbewertung - ist die regelmäßige aktive Beteiligung am wissenschaftlichen Diskurs.

*COLLOQUIUM***RESEARCH COLLOQUIUM: INTERDISCIPLINARY PERSPECTIVES
ON EPISODIC MEMORY (212102)**

PROF. DR. SEN CHENG

TERM:	Winter 2023/24
MEETING TIME:	Friday, 14.00 – 16.00 (First Meeting: 13.10.2023)
ROOM:	GA 04/187
CP:	3

This research colloquium covers the range of topics in the interdisciplinary research unit FOR 2812 "Constructing scenarios of the past: A new framework in episodic memory". Presentations will focus on the cognitive and neuronal mechanisms underlying scenario construction in episodic memory. The discussed studies employ and integrate approaches from philosophy, psychology, as well as experimental and computational neuroscience. The colloquium hosts talks by leading international experts and local researchers as well as presentations by doctoral and master students. In addition, students will read journal articles and book chapters related to the topics of the talks.

Assessment: term paper

Course material: available on Moodle (registration required)

Contact: Prof. Dr. Sen Cheng, NB 3/33, sen.cheng@rub.de

Office hours: Thursdays 14:00-15:00

Capacity: max. 15 students

Enrollment: eCampus

Requirements: advanced knowledge of learning and memory

*LECTURE & EXERCISE***INTRODUCTION TO NEURAL DATA SCIENCE (212014)**

PROF. DR. ROBERT SCHMIDT

TERM:	Winter 2023/24
LECTURE:	Thursday, 10 – 12 (First Meeting: 12.10.2023)
ROOM:	IC 03/449
EXERCISE:	Thursday, 12 – 14 (First Meeting: 12.10.2023)
ROOM:	ID 03/121 (CIP-Pool 2)
CP:	6

This course can be used either in module AM4 or in module I3.

Rapid technological advances have recently opened up new possibilities in understanding how the brain works. In particular the number of neurons that can be simultaneously recorded has increased considerably to hundreds (and soon thousands!) of neurons. However, this has led to a big challenge on how to actually process and analyze the resulting big data sets. Solutions for these challenges are part of the new exciting research field of 'Neural Data Science'.

In this module you will learn how methods and approaches from data science and machine learning can be applied to study brain signals and the related cognitive functions. In the first part of the module we will focus on so-called spike trains, how they can be analyzed, visualized, and decoded. In the second part of the module we will look at continuous signals, in particular at neural oscillations. Finally, we will learn about and apply some advanced methods from machine learning, such as dimensionality reduction approaches, reinforcement learning, clustering, and computational statistics. In the lectures I will provide the relevant neurobiological background and explain the computational approaches, which will then be applied in the computer exercises using real neural data sets.

Requirements: Basic knowledge of calculus and linear algebra, programming in Python

Literature:

Nylen, E. L., & Wallisch, P. (2017). Neural Data Science: A Primer with MATLAB® and Python™. Academic Press.

SEMINAR

JOURNAL CLUB: LEARNING AND MEMORY (212103)

PROF. DR. SEN CHENG

TERM:	Winter 2023/24
MEETING TIME	Tuesday, 14 – 16 (First Meeting: 10.10.2023)
ROOM:	NB 3/72
CP:	3

We will discuss the latest research results in learning and memory at the systems level. Each session will be based on a journal article or unpublished results. These will be presented by one participants and discussed by all. The topics will include a diverse set of approaches: electrophysiology, imaging, computational modeling, and robotics. They will be selected particularly in the areas of spatial and episodic memory with a focus on the functional role of the mamalian hippocampus.

Contact: Prof. Dr. Sen Cheng, NB 3/33, sen.cheng@rub.de

Office hours: Thursdays 14:00-15:00 (Cheng)

Capacity: max. 15 students

Enrollment: ecampus

*ONE-WEEK PRACTICAL COURSE***AUTONOMOUS ROBOTICS (212401)**

PROF. DR. RER. NAT. GREGOR SCHÖNER

TERM:	Winter 2023/24
MEETING TIME:	Preliminary Meeting: 22.02.2024 10.00 – 11.00; room NB 02/77 Block: 26.02.24 – 01.03.24, 10 - 18
ROOM:	NB 02/77
CP:	3

This course can be used either in module C2 or in module I3.

The practical course gives an introduction to mobile robotics with a focus on dynamical systems approaches. The open-source simulation environment Webots is used to control e-puck miniature mobile robots, equipped with a differential drive, combined infrared/proximity sensors and a video camera. The course covers elementary problems in robot odometry, use of sensors and motor control. It then teaches basic dynamic methods for robot navigation, in which the robot's sensors are used for obstacle avoidance and approach to a target location.

The practical part of the lab course consists of a week of full-time work in which students solve programming tasks with simulated mobile robots. The students then write reports in which they describe and analyze the work they have done. The grade for the lab course is based on both the practical work and the report. Students will get support during programming.

Registration: Via E-Learning (registration period: 02.10.23 – 10.11.23)

<https://www.ini.rub.de/elearning/?eid=425>

*COLLOQUIUM***RESEARCH COLLOQUIUM NEUROPSYCHOLOGY (118916)****[FORSCHUNGSKOLLOQUIUM NEUROPSYCHOLOGIE]**

PROF. DR. NIKOLAI AXMACHER

TERM:	Winter 2023/24
MEETING TIME:	Thursday 14 – 16 (First meeting: 19.10.2023)
ROOM:	IB 6/127
CP:	3

The content of this course is to present current research work in the spheres of neuropsychology and talks by guest professors on clinical neuropsychological topics. The schedule with information on the topics and speakers will be posted on the information board and at <http://www.ruhr-uni-bochum.de/neuropsy/> before the start of the WS. The central educational goal of this course – and as such the basis for a successful participation and awarding of credits – is regular active contribution to the scientific discourse. Therefore, regular attendance in the scope of at least 2/3 of the sessions is required.

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14. Cognitive Neuroscience

*COLLOQUIUM***BIOPSYCHOLOGY RESEARCH COLLOQUIUM (118914)**

PROF. DR. PHIL. DR. H.C. ONUR GÜNTÜRKÜN

TERM:	Winter 2023/24
MEETING TIME:	Monday, 13 – 15 (First meeting: 16.10.2023)
ROOM:	IB 6/127
CP:	3

The research colloquium is open to all employees and graduate students of the Biopsychology department. The aim is to present and discuss their research. In addition, external guests are invited to give talks on different aspects of biopsychology.

You can have a look at the schedule at the department's information board and our homepage: <http://www.bio.psy.ruhr-uni-bochum.de/>.

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14. Cognitive Neuroscience

*COLLOQUIUM***COLLOQUIUM: NEURAL BASIS OF LEARNING (118919)****[KOLLOQUIUM: NEUROBIOLOGIE DES LERNENS]**

PROF. DR. JONAS ROSE, LUTZ WEHRLAND, MSc.

TERM:	Winter 2023/24
MEETING TIME:	Friday, 12 – 14
ROOM:	GA 04/187
CP:	3

A broad range of current research topics in cognitive neuroscience will be covered by internal and external speakers. Our focus lies in a mechanistic understanding of crucial processes that in turn form the basis of higher cognition.

A schedule will be available on the homepage <https://www.ngl.psy.ruhr-uni-bochum.de/ngl/>

*COLLOQUIUM***THEMEN DER KOGNITIVEN NEUROWISSENSCHAFT (118711)**

PROF. DR. PHIL. DR. H.C. ONUR GÜNTÜRKÜN,

PROF. DR. OLIVER T. WOLF, PROF. DR. NIKOLAI AXMACHER

TERM:	Winter 2023/24
LECTURE:	Friday, 10 – 12 (First meeting: 20.10.2023)
ROOM:	IB 6/127
CP:	3

Please enrol in the following Moodle course to find more information about requirements and possible Master thesis topics in Biopsychology/Neuropsychology and Cognitive Psychology:

<https://moodle.ruhr-uni-bochum.de/enrol/index.php?id=53886>

In dieser Veranstaltung werden laufende Forschungsprojekte, die sich für eine M.Sc. Arbeit eignen, vorgestellt. Ein zentrales Lernziel dieser Veranstaltung - und damit auch Grundlage für die erfolgreiche Teilnahme und Leistungsbewertung - ist die regelmäßige aktive Beteiligung am wissenschaftlichen Diskurs. Daher ist eine regelmäßige Anwesenheit im Umfang von mindestens zwei Dritteln der Termine notwendig.

Voraussetzungen: Interesse an neurowissenschaftlicher Master-Arbeit

Literatur: wird in der Veranstaltung bekannt gegeben.