

Course Guide – Master Cognitive Science

Winter 2021/22

Version as of 27.10.2021

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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.

Essay Writing Course in Philosophy:

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 "academic essay writing". 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. Exceptions have to be approved by Dr. Alfredo Vernazzani (alfredo-vernazzani@daad-alumni.de) or by Prof. Dr. Albert Newen (albert.newen@rub.de). 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 (251211)

EWA BEHLING

TERM:	Winter 2021/22
MEETING TIME:	September 27 – October 8, 12.30 - 14.30
ROOM:	SH 1/101a (Online)

This course takes into account the particular needs of the students of the Master Program in Cognitive Science and covers all competencies that are necessary to study in English. It focusses on productive skills that will be practiced by means of discussions and short presentations on study-related issues. Using a task-based approach, listening, reading, writing and speaking skills will be trained intensively and social and intercultural competencies will be included as well. Authentic lectures and academic texts on chosen topics related to philosophy, psychology and neuroscience will be used throughout the course.

The course will be accompanied by a Moodle component to enhance classroom teaching and self-study at home. The Zoom-information will be also provided in Moodle.

At the end of the course the participants have to write a final test that will comprise all four skills taught in class.

Literature: Materials compiled from a variety of sources will be used.

Biostatistics

SEMINAR
BIOSTATISTICS (119212)
MARTIN BORDEWIECK

TERM: Winter 2021/22
MEETING TIME: September 27 – October 8, 08.30 - 11.30
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 COMPUTERSCIENCE FOR MODELING
(310034)**
JAN TEKÜLVE

TERM: Winter 2021/22
MEETING TIME: September 27 – October 8, 15.00 - 17.30
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 030005 & EXERCISE 030103)

PROF. ALBERT NEWEN, PROF. MARTIN BRÜNE,
PROF. ONUR GÜNTÜRKÜN, PROF. NIKOLAI AXMACHER,
PROF. NIKOL RUMMEL, PROF. MARKUS WERNING,
PROF. TOBIAS SCHLICHT, PROF. GREGOR SCHÖNER,
PROF. LAURENZ WISKOTT, PROF. SEN CHENG

TERM:	Winter 2021/22
LECTURE:	Wednesday, 12 – 14 (First Meeting: 13.10.2021)
ROOM:	Online
EXERCISE:	Wednesday, 14 – 16 (First Meeting: 20.10.2021)
ROOM:	Mostly in person (GABF 05/703)
CP:	6

Attention:

- Further details of the Lecture and Exercise plan will be announced later.
- Lecture and Seminar #14 take place in LWL-Universitätsklinik Bochum, Alexandrinenstraße 1, 44791 Bochum

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 philosophy student the credit points are delivered on the basis of a written examination or on the basis of an oral exam. 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.

Office hours during the semester, Newen: Thursday 12-13 pm

The structure of the lecture:

1. Introduction: History of Cognitive Science
2. Enacted and Embodied Cognition
3. Computational Modeling
4. Modeling Vision
5. Models of Learning and Memory
6. Cognitive Neuroscience of Perception
7. Theory of Perception and Cognition
8. Consciousness and Perception
9. Cognitive models of semantics and pragmatics
10. Theories of Emotion
11. Cognitive Neuroscience of Emotion
12. Cognitive Neuroscience of Memory
13. Psychology of Learning
14. Social Cognition: Evolution, Development, Pathology
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 Dr. Alfredo Vernazzani (alfredo-vernazzani@daad-alumni.de) or by Prof. Dr. Albert Newen (albert.newen@rub.de).

BM1

BM1. Experimental Psychology Lab

SEMINAR

EXPERIMENTAL PSYCHOLOGICAL LAB (119213)

DR. SIMON E. BLACKWELL

TERM:	Winter 2021/22
MEETING TIME:	Wednesday, 10 – 12 (First meeting: 20.10.2021)
ROOM:	IA 1/163
CP:	6

The Experimental Psychology Lab course aims at introducing the principles of experimental psychology. The participants will learn how to plan and conduct own experimental studies, and how to analyse the data.

As a result, all participants will write a first scientific report.

SEMINAR

LOGIC AND PHILOSOPHICAL METHODOLOGY (030111)

DR. CORINA STRÖBNER

TERM:	Winter 2021/22
MEETING TIME:	Tuesday, 14 – 16 (First meeting: 12.10.2021)
ROOM:	GABF 04/514
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. The course "Computational Neuroscience – Neural Dynamics" by Prof. Dr. Schöner is recommended for students with quite some math preparation, typically as covered in two semesters of higher mathematics (functions, differentiation, integration, differential equations, linear algebra). If you feel unsure about your mathematical skill level, you can participate in the first lecture (14.10.2021) where Prof. Dr. Schöner will explicate what math preparations he presupposes and make a decision afterwards.

If you are not equipped with the necessary mathematical groundwork, make sure to attend the MatLab seminar, only offered in summer semesters. If you are coming with more background in mathematics, feel free to choose other offers (by lecturers Schöner & Cheng).

Students have to pass only one course in BM3.

*LECTURE & EXERCISE***COMPUTATIONAL NEUROSCIENCE – NEURAL DYNAMICS
(310001 & 310011)**

PROF. DR. GREGOR SCHÖNER

TERM:	Winter 2021/22
LECTURE:	Thursday, 14 – 16 (First meeting: 14.10.2021)
ROOM:	Online
EXERCISE:	Thursday, 16 – 17 (First meeting: 21.10.2021)
ROOM:	Online
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 feature 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. 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***ARTIFICIAL NEURAL NETWORKS (310002 & 310012)**

PROF. DR. SEN CHENG

TERM:	Winter 2021/22
LECTURE:	Monday, 16 – 18 (First meeting: 11.10.2021)
ROOM:	Online
EXERCISE:	Friday, 10 – 12 (First meeting: 15.10.2021)
ROOM:	Online
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.

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

PROF. DR. BORIS SUCHAN

TERM:	Winter 2021/22
MEETING TIME:	Tuesday, 10 – 12 (First meeting 19.10.2021)
ROOM:	Online or 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:

Kolb & Wishaw: Fundamentals in human neuropsychology.

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

C. Topics Selection

Remarks for Essay Writing

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 term the seminar of Dr. Roy Dings "Action and Interaction". It can be evaluated as C1 or AM1. For students who studied philosophy during the BA program, this course can only count for the C1 module.

SEMINAR

ACTION AND INTERACTION (030081)

DR. ROY DINGS

TERM:	Winter 2021/22
MEETING TIME:	Thursday, 14 – 16 (First meeting: 14.10.2021)
ROOM:	GABF 04/514
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 Roy Dings. It can be evaluated as C1 or AM1. Details about the demands are clarified in the first meeting.

In this seminar we will perform a close reading of Shaun Gallagher's recent book *Action and Interaction* (2020, OUP). The book consists of three parts, where the first part deals with demarcating 'actions', clarifying the temporal structure of actions, the meaning of actions and different senses of agency. The second part turns to 'interaction'. In this part Gallagher outlines his 'interaction theory' of social cognition and defends it from other mindreading approaches to social cognition. Finally, in part three, Gallagher explores the implications of the first two parts for thinking about how we as agents are shaped by our social practices and institutions. The ultimate goal of the book is to have a clearer understanding of autonomous agency and morally responsible action.

The book contains a treasure trove of interesting ideas, and Gallagher substantiates his analyses by drawing on diverse fields such as philosophy of action, embodied and enactive cognitive science, hermeneutic phenomenology, and critical social theory. No substantial background knowledge in these fields is required. Where necessary the lecturer will provide background information.

After an introductory session, each subsequent session will be devoted to discussing a chapter of the book. Ideally, towards the end of the semester Prof. Gallagher will be invited for an online session so that the students may interact directly with the author of this book.

Literature:

Shaun Gallagher (2020). *Action and Interaction*. Oxford University Press.

I recommend the students to obtain this book before or immediately after starting the seminar (please consider possible delays of delivery)

Some additional reading material may be made available via Moodle.

*SEMINAR***BEING A PERSON AND UNDERSTANDING OTHER PERSONS
(030104)**

PROF. DR. ALBERT NEWEN, PROF. DR. KATJA CRONE (TU DORTMUND)

TERM:	Winter 2021/22
MEETING TIME:	Monday, 16 – 18 (First meeting: 11.10.2021)
ROOM:	Hybrid (Mainly online, partially in person: GA 3/143.)
CP:	3 or 6

In this seminar, we will explore the relation between personhood and the ability to understand other persons.

In the first part of the course, we will turn to the concept of a person. What is constitutive for persons, and what distinguishes a person from a non-person? We will take a closer look at some central characteristics such as self-awareness, (moral) agency, and the ability to entertain a self-narrative and to have a self-concept. Also, we will discuss the role social groups and society in general play in establishing beings as persons.

In the second part of the seminar, we will focus on the question of what it means to recognize and to understand other persons in the light of some of the previously explored person-making characteristics. We start with an overview of the classical positions of Theory-Theory and Simulation Theory. We then turn to more recent approaches such as the Interaction Theory and the Person Model Theory. In addition to theoretical overview articles, we will also select some articles discussing psychological evidence about understanding others including low-level perceptual information as well as high-level linguistic information from others. The aim of the seminar is to combine the question of personhood with the question of social cognition such that we are able to outline a unified perspective of both phenomena.

The course will be organized as a hybrid course. Participation can also be realized completely online. But we plan a meeting in person every two weeks. We change the place of the seminar meeting each time and will let the participants know when it is in Bochum and when in Dortmund. Both universities can be reached by public transport within 40 minutes (from mid campus to mid campus).

SEMINAR

COMPUTER SIMULATIONS IN SCIENCE (030082)

DR. BENEDIKT FAIT

TERM:	Winter 2021/22
MEETING TIME:	Thursday, 10 – 12 (First meeting: 14.10.2021)
ROOM:	GABF 04/516
CP:	3 or 6

For more than half a century, the digital computer has become more and more a tool of scientific research, and now some sciences perform a large part of their experiments 'in silico'. Not only are the phenomena that this method aims to better understand complex, but the tool itself, i.e. computer simulations of these phenomena, has become so complex that we observe a trade-off between traditional explanation and 'understanding' on the one hand, and other epistemic goals – especially prediction – on the other. Climate models are characterized by what Eric Winsberg calls "distributed epistemic agency", with the effect that although these models can no longer be truly 'understood' by any single person, they perform remarkably well in prediction. While there seems to be no alternative to the use of computer simulations in climate science, the extent to which simulations can be used in other sciences such as the social sciences or medicine is still controversial and unclear.

To better understand all this, in the seminar we will read and discuss texts that address the following questions: How can computer simulations improve science and scientific understanding? Do computer simulations change the focus of scientific research and the goals of science? What are the epistemic opportunities, as well as the epistemic risks, associated with the use of computer simulations? What can sciences such as the social sciences learn from the highly successful use of computer simulations, e.g., in climate science?

The literature will be provided via Moodle. A preliminary discussion will take place at the first meeting. ECTS can be achieved by essays, talks/presentations, seminar papers and oral examinations. Appointments for oral examinations can be made during the semester break, and written papers must be submitted no later than March 31, 2022.

Literature (recommended for introduction):

Winsberg, Eric, "Computer Simulations in Science", The Stanford Encyclopedia of Philosophy (Winter 2019 Edition), Edward N. Zalta (ed.), URL: <https://plato.stanford.edu/archives/win2019/entries/simulations-science/>.

SEMINAR

AGENCY IN PHILOSOPHY AND THE SCIENCE: FROM PLANTS TO HUMANS (030101)

JUN-PROF. DR. JAN BAEDKE &
ALEJANDRO FÁBREGAS-TEJEDA, M.A.

TERM:	Winter 2021/22
MEETING TIME:	Thursday, 10 – 12 (First meeting: 14.10.2021)
ROOM:	GA 3/143
CP:	3 or 6

The concept of 'agency' has played a fundamental role in the history of philosophy and the sciences since antiquity. For instance, it has ignited debates about the ontological status of organisms and the activities they undertake in the world. Moreover, it has been tied up with the notions of action and intention, and with ramifications in long-standing philosophical debates on determinism and free will, personhood, moral responsibility, or the nature of causation. This seminar offers an introduction to the historical and contemporary uses and configurations of the concept of agency in diverse contexts. From a philosophical perspective, it will trace the early usages of the concept, its uptake in the natural and human sciences, and the current strands of theorization. Furthermore, the course will navigate cognate concepts such as goals, goal-directedness, normativity, agent, teleology, and purposiveness.

Three thematic axes articulate the seminar: (1) the debate concerning agency as a purported feature of organisms (from bacteria to plants and humans) in the history of philosophy, history and philosophy of biology, and philosophical anthropology; (2) the characteristics of human agency as seen through discussions in the philosophy of action and 'agent causation' (e.g., the distinctive deliberative, social and practical capacities of human beings); and (3) the roles the concept of agency plays in a subset of the natural and human sciences (e.g., cognitive sciences, anthropology, and robotics), and how the concept has been mobilized to understand knowledge production within manifold scientific practices.

In sum, through the analysis of classic and contemporary texts from philosophy, biology and other sciences, this seminar scrutinizes agency as an important concept for contemporary reflection. In that sense, the seminar will provide a comprehensive introduction to central questions and problems in today's philosophy of agency (broadly construed). To pass the course, students must participate in the first meeting, actively partake in the discussions, and conduct a presentation (or take other course activities).

Literature:

- Schlosser, Markus (2019): Agency. In: Zalta, Edward N. (eds.): The Stanford Encyclopedia of Philosophy (Winter 2019 Edition). [Available online] [suggested preparation literature]
- Davidson, Donald (1980): Essays on Actions and Events. Oxford: Clarendon Press.
- Mayr, Erasmus (2011): Understanding Human Agency. Oxford: Oxford University Press.
- Paul, Sarah (2021): Philosophy of Action: A Contemporary Introduction. New York and London: Routledge.

SEMINAR

MACHINE CONSCIOUSNESS (030102)

DR. WANJA WIESE

TERM:	Winter 2021/22
MEETING TIME:	Tuesday 16 – 18 (First Meeting: 12.10.2021)
ROOM:	GABF 05/707
CP:	3 or 6

Can machines be conscious and how could we find out? Understanding consciousness in human and non-human animals is hard but understanding machine consciousness seems even harder. At the same time, rapid advances in AI and growing ethical concerns about the creation of machine consciousness demand an answer to the question under what conditions consciousness should be ascribed to artificial entities.

The seminar has a systematic focus on contemporary philosophy of consciousness and machine ethics. We will first discuss theories and general problems of consciousness. We will then apply these to the question under what conditions machines can be conscious. Finally, we will discuss ethical questions of machine consciousness: Would conscious machines be able to suffer, perhaps in ways we cannot even imagine? Is the attempt to create conscious machines unethical, or do the potential benefits outweigh the risks? What moral rights should conscious machines have? Could machines be moral agents and have moral responsibility?

Literature:

- Dehaene, S., Lau, H., & Kouider, S. (2017). What is consciousness, and could machines have it? *Science*, 358, 486–492.
- Metzinger, T. (2021). Artificial Suffering: An Argument for a Global Moratorium on Synthetic Phenomenology. *Journal of Artificial Intelligence and Consciousness*, 1–24.
<https://doi.org/10.1142/S270507852150003X>
- Reggia, J. A. (2013). The rise of machine consciousness: Studying consciousness with computational models. *Neural Netw*, 44, 112–131. <https://doi.org/10.1016/j.neunet.2013.03.011>
- Schneider, S. (2019). *Artificial You: AI and the future of your mind*. Princeton University Press.
- Wallach, W., & Allen, C. (2009). *Moral Machines*. Oxford University Press.

SEMINAR

PHILOSOPHY OF ARTIFICIAL INTELLIGENCE (030088)

DR. ELMARIE VENTER, M.A.

TERM:	Winter 2021/22
MEETING TIME:	Wednesday 12 – 14 (First Meeting: 13.10.2021)
ROOM:	GABF 05/707
CP:	3 or 6

The application of artificial intelligence (AI) is all around us and raises many interesting questions. In this seminar, we will concern ourselves with the concept of 'mind' – its nature, implementation, and application. What requirements must a 'mind' fulfil in order to be considered a mind? We will discuss the historical roots of this question and look at some major types of AI such as GOFAI (Good Old-Fashioned AI), artificial neural networks, and dynamical systems. We will concern ourselves with the philosophical implications of AI by engaging with a series of articles and book chapters from philosophers and cognitive scientists including Joel Walmsley, Daniel Dennett, and Margaret Boden.

Literature:

Course material will be made available on Moodle throughout the semester. In addition to academic papers, chapters will be selected from the following books:

Boden, M.A., 2016. AI: Its Nature and Future. Oxford University Press.

Walmsley, J., 2012. Mind and Machine. Palgrave Macmillan.

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

PROF. DR. ONUR GÜNTÜRKÜN

TERM:	Winter 2021/22
MEETING TIME:	Thursday, 12 – 14 (First Meeting: 21.10.2021)
ROOM:	Online or IA 02/461
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

APPLIED SOCIAL PSYCHOLOGY II (PART 1 & 2)**(117433 & 117434)**

LUSINE GRIGORYAN

TERM:	Winter 2021/22
MEETING TIME:	Wednesday, 10 – 12 & 12 - 14 (First Meeting: 13.10.2021)
ROOM:	IA 02/452 (Hybrid)
CP:	6

This course consists of two seminars which must be taken together.

In this seminar, students will apply psychological theories of behavioral change, persuasion, and social influence to various pressing social issues. Students can work on an issue they find most important or interesting, from sustainability to entrepreneurship to migrant integration and sexism. Students will work in groups and can choose one of the three formats for their group project: a media campaign, a psychological intervention, or a policy proposal. The final project should be submitted as a written proposal and presented as a pitch for a hypothetical governmental body or an NGO that might fund your project

Though the philosophical reflection on economics is as old as economics itself, the first philosopher of economics in the proper sense of the word is John Stuart Mill (1806–1873). Since then, there has been an ongoing and quite diverse development of the subject. Particularly in the last thirty years, economics and philosophy have come closer together due to advances and aspirations on both sides. But still, economics is a science with certain peculiarities which makes it quite interesting from the philosophy of science point of view. Albeit philosophy of economics comprises also ethical issues, the seminar will focus solely on theoretical issues, especially on models and causation in economics. Hence, the (highly interrelated) questions the seminar will deal with are, among others: what is economics in the first place? What is a (good) economic model? How must one assess the fact that many economic models rely on highly unrealistic assumptions? What about causation in economics – do paradigmatic macroeconomic generalizations like the Phillips Curve represent causal relationships? What is the ontological status of economic phenomena? And can economics be a proper science at all?

Prior knowledge of (philosophy of) economics is recommended but not presupposed. The relevant literature will be provided via Moodle. A preliminary discussion will take place at the first meeting.

Literature (suitable for preparation):

Backhouse, R. E. and Medema, S. G. (2009): "On the Definition of Economics", *The Journal of Economic Perspectives*, 23(1), 221–234.

Frigg, R. and Hartmann, S. (2020): "Models in Science", in: Zalta, E. N. (Ed.): *The Stanford Encyclopedia of Philosophy* (Spring 2020 Edition), URL: <https://plato.stanford.edu/archives/spr2020/entries/models-science/>.

Hausman, D. M. (2018): "Philosophy of Economics", in: Zalta, E. N. (Ed.): *The Stanford Encyclopedia of Philosophy* (Fall 2018 Edition), URL: <https://plato.stanford.edu/archives/fall2018/entries/economics/>.

BLOCK SEMINAR
MOTOR LEARNING (119003)
SUSANNE DYCK

TERM:	Winter 2021/22
MEETING TIME:	Preparatory meeting: 06.11.2021; Block: December 4 th - 5 th 2021
ROOM:	Online
CP:	3

Motor learning plays an essential part in our life, not only in sports but also regarding everyday activities. This block seminar offers an introduction into the area of motor learning research. We will focus on motor adaptation and motor sequence learning which are the two main paradigms used to study motor learning on a behavioral and neural level. We will discuss recent papers from the field of motor learning using a variety of neuroscientific methods (behavioral, EEG, fMRI). The seminar will be held online via Zoom.

Assessment: presentation of a paper

Capacity: max. 16 students

*LECTURE & EXERCISE***ARTIFICIAL NEURAL NETWORKS (310002 & 310012)**

PROF. DR. SEN CHENG

TERM:	Winter 2021/22
LECTURE:	Monday, 16 – 18 (First meeting: 11.10.2021)
ROOM:	Online
EXERCISE:	Friday, 10 – 12 (First meeting: 15.10.2021)
ROOM:	Online
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.

*BLOCK SEMINAR***BELIEVE THE HYPE!?! THE PROS AND CONS OF NEUROSCIENTIFIC METHODS IN PSYCHOLOGICAL RESEARCH (119215)**

DR. CAROLINE SCHLÜTER

TERM:	Winter 2021/22
MEETING TIME:	Obligatory preparatory meeting: 22.10.2021, 12 – 14 (Online) Block: session times see below (In person)
ROOM:	IA 1/161
CP:	3

Modern neuroscientific methods allow us to examine questions of social, motivational, and personality research from a neurobiological perspective. In this seminar, we will use contemporary research results to discuss the pros and cons of neuroscientific methods in psychological research.

Sessions:

Fri (22.10.21) 12:00 – 14:00 (obligatory preparatory discussion: online)

Sat (15.01.22) 10:00 – 18:00 (in presence/can be updated)

Fri (21.01.22) 12:00 – 18:00 (in presence/can be updated)

Sat (22.01.22) 10:00 – 16:00 (in presence/can be updated)

*LECTURE & EXERCISE***MACHINE LEARNING: UNSUPERVISED METHODS
(310003 & 310013)**

PROF. DR. LAURENZ WISKOTT

TERM:	Winter 2021/22
LECTURE:	Tuesday, 12 – 14 (First Meeting: 12.10.2021)
EXERCISE:	Tuesday, 10.30 – 12 (First Meeting: 12.10.2021)
ROOM:	Online
CP:	6

Goals:

- (i) The students should get to know a number of unsupervised learning methods.
- (ii) They should be able to discuss which of the methods might be appropriate for a given data set.
- (iii) They should understand the mathematics of these methods.

This course covers a variety of unsupervised methods from machine learning such as principal component analysis, independent component analysis, vector quantization, clustering, self-organizing maps, growing neural gas, Bayesian theory and graphical models. We will also briefly discuss reinforcement learning.

The mathematical level of the course is mixed but generally high. The tutorial is almost entirely mathematical. Mathematics required include calculus (functions, derivatives, integrals, differential equations, etc), linear algebra (vectors, matrices, inner product, orthogonal vectors, basis systems, etc), and a bit of probability theory (probabilities, probability densities, Bayes' theorem, etc).

SEMINAR

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

DR. MARKUS WERKLE-BERGER

TERM:	Winter 2021/22
MEETING TIME:	Wednesday, 10 – 12 First meeting: 11.10.2021 via webex (link in Moodle)
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. Re-activation 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.

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

PROF. DR. JONAS ROSE, DORIAN RÖDERS

TERM:	Winter 2021/22
MEETING TIME:	March 7 th - March 11 th Preliminary Meeting: 21.02.2022 (GA 04/187)
ROOM:	Online
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

Memory & Learning

*SEMINAR***DISCOURSE NEUROPSYCHOLOGY (118611)**

ELIAS RAU, M.SC.

TERM:	Winter 2021/22
MEETING TIME:	Thursday, 10 – 12 (First Meeting: 21.10.2021)
ROOM:	IA 1/169
CP:	3

Establishing and retrieving a memory trace is a hallmark of (human) cognition. How are such memories implemented in the brain and how can we track them using behavioral and neuroscientific methods? In this journal club, we will read and discuss relevant literature from the cognitive neurosciences and review evidence on the neural representations of memories. To gain credits you need to participate regularly (66%) and actively in the weekly sessions and prepare a (short) presentation introducing one of the topics.

SEMINAR

THE PHILOSOPHY OF MEMORY: HISTORICAL, PHENOMENOLOGICAL AND ANALYTICAL PERSPECTIVES (030106)

PROF. DR. MARKUS WERNING

TERM:	Winter 2021/22
MEETING TIME:	Wednesday 14 – 16 (First Meeting: 13.10.2021)
ROOM:	GA 04/187
CP:	3 or 6

Memory has been a topic of philosophy since antiquity and as has regained attention in both phenomenological as well as analytical branches of modern philosophy. This seminar aims at a synopsis of historical, phenomenological, and analytic approaches in the philosophy of memory. Accordingly, the seminar will be divided into three parts. In the first part, we will review historical approaches such as Plato's, Augustine's, Locke's and Reid's. The second part will focus on the 19th & 20th century phenomenological tradition. Here the question came up whether memory is just a kind of archive, from which stored information can be retrieved, or whether aspects of a particular form of consciousness in remembering, such as the experience of temporality and corporeality, are equally important. Phenomenologists have provided analyses starting from questions like: Do attention and habit influence the content of our memories? Does only temporal proximity make some memories more vivid than others? What is the role of consciousness in remembering? This part of the seminar will be devoted to phenomenologists like Bergson, Husserl, Merleau-Ponty, Proust, and Ricoeur. In the third part of the seminar, we will turn to accounts of memory from within analytical philosophy such as Martin & Deutscher and Bernecker. The seminar will conclude with a discussion contemporary position regarding the unity and taxonomy of memory, the question whether certain forms of memory are a natural kind and how memory relates to mental time travel.

Students will have the opportunity to link up with our DFG research group "Constructing Scenarios of the Past", the Bochum-Grenoble Memory Colloquium and our DFG Research Training Group "Situated Cognition". Aside from active participation, participants will be expected to give a presentation in English. Assistance regarding the English language will be provided upon request.

Literature:

- Bergson, H. (1991) *Matter and Memory*, trans. N. M. Paul and W. S. Palmer. New York: Zone.
- Bernecker, S. (2010). *Memory : a philosophical study*. Oxford University Press.
- Bernecker, S., & Michaelian, K. (Eds.). (2017). *The Routledge Handbook of Philosophy of Memory*. Routledge. <https://doi.org/10.4324/9781315687315>
- Cheng, S., & Werning, M. (2016). "What is Episodic Memory if it is a Natural Kind?" *Synthese*, 193, 1345–1385. <https://doi.org/10.1007/s11229-014-0628-6>
- Fuchs, T. (2005). "Implicit and explicit temporality", *Philosophy, Psychiatry & Psychology*, 12, 195–198.
- Husserl, E. (1991). "On the phenomenology of the consciousness of internal time (1893–1917)". In *Collected works of Edmund Husserl (Vol. 4)*. Trans. J. B. Brough. Dordrecht: Springer
- Husserl, E. (2001). *Analyses concerning passive and active synthesis: Lectures on Transcendental Logic*, Dordrecht: Kluwer Academic Publishers.
- Krell, D. F. (1982). "Phenomenology of Memory from Husserl to Merleau-Ponty", *Philosophy and Phenomenological Research*, Vol. 42, No. 4, pp. 492-505.

- Merleau-Ponty, M. (2012). *Phenomenology of perception*. Trans. D. E. Landes. New York: Routledge.
- Proust, M. (1971). "Contre Sainte-Beuve" (CSB), précédé de Pastiches et mélanges et suivi de Essais et articles, Paris: Gallimard.
- Ricoeur, P. (2003). "Narrative Identity", in Wood, D. (eds.), *On Paul Ricoeur. Narrative and Interpretation*, London and New York: Routledge.

*SEMINAR***THINKING AND REASONING – CONCEPTUAL, BEHAVIORAL,
AND NEURO-COGNITIVE PERSPECTIVES (030097)**

DR. MATTHIAS UNTERHUBER

TERM:	Winter 2021/22
MEETING TIME:	Monday, 10 – 12 (First Meeting: 11.10.2021)
ROOM:	GA 04/187
CP:	3 or 6

The study of reasoning and thinking– which is closely related to thinking and problem solving – is an integral part of the neuro- and cognitive sciences. This seminar focuses on central paradigms in this area (e.g., the Wason selection task and the conditional inference task) and discusses recent approaches to these phenomena in the light of behavioral data and neuro-cognitive markers of neural-cognitive processes as well as their conceptual underpinnings. The discussion is interdisciplinary in nature and takes into account perspectives from philosophy, linguistics, psychology, and the neuro- and cognitive sciences.

SEMINAR

WHAT IS INFORMATION? (030091)

JUN-PROF. KRISTINA LIEFKE

TERM:	Winter 2021/22
MEETING TIME:	Thursday, 14 – 16 (First Meeting: 14.10.2021)
ROOM:	GA 04/187
CP:	3 or 6

Information takes a central role in our social and scientific lives. As a result, it is perhaps surprising that the concept of information has only recently started to receive broader attention in philosophy. This seminar gives an introduction to this emerging topic, focusing on semantic information. The latter is information about the world that can be true or false and that can constitute knowledge. We will start the semester by distinguishing information from some of its cognate concepts (incl. data, meaning, representation), by asking how data can turn into information, and by delineating different kinds of information (esp. semantic vs. ecological/natural information). In the second half of the semester, we will discuss different approaches to semantic information that identify information with representational content, and we will ask how this kind of content can acquire a truth-value. Finally, we will discuss the question whether misinformation is a kind of information and whether all semantic information is (or needs to be) propositional.

Prerequisites: basic familiarity with logic and the philosophy of language

Readings:

A selection of texts will be made available through Moodle before the start of the semester. This selection will include (a.o.) the following texts:

- Dretske, F. I. (1983). Précis of Knowledge and the Flow of Information. *Behavioral and Brain Sciences*, 6(1), 55-90.
- Floridi, L. (2008). Trends in the philosophy of information. In P. Adriaans & J. v. Benthem (eds.) *Philosophy of Information* (pp.113-132). Amsterdam: Elsevier.
- Floridi, L. (2016). Semantic information. In L. Floridi (ed.) *The Routledge Handbook of Philosophy of Information* (pp.44-49). Routledge.
- Grice, H. P. (1957). Meaning. *The Philosophical Review*, 66(3), 377-388.

SEMINAR

THEORY OF MIND - UNDERSTANDING THE MENTAL STATES OF OTHERS (030089)

DR. JULIA WOLF

TERM:	Winter 2021/22
MEETING TIME:	Thursday, 10 – 12 (First Meeting: 14.10.2021)
ROOM:	GABF 04/358
CP:	3 or 6

How do we come to understand others as beings with thoughts and beliefs which shape their behaviour? This is the central question addressed by research on 'Theory of Mind'. One much debated issue by both psychologists and philosophers is the question of when and how children develop the ability to attribute false beliefs to others, which is thought to be one of the core 'Theory of Mind' abilities. In this seminar we will focus especially on the evidence from the false belief task, the main tool used to study children's developing ability to attribute beliefs to others, and the philosophical and psychological implications of this research. Key issues focused on in the seminar will be the puzzles in understanding the development of children's belief understanding that arise out of the evidence, as well as assessing the importance of belief attribution within social cognition.

Reading lists and literature will be provided via Moodle.

AM. Advanced Methods

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

AM1

AM1. Theory Formation and Conceptual Analysis

SEMINAR

ACTION AND INTERACTION (030081)

DR. ROY DINGS

TERM:	WINTER 2021/22
MEETING TIME:	THURSDAY, 14 – 16 (FIRST MEETING: 14.10.2021)
ROOM:	GABF 04/514
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 Roy Dings. It can be evaluated as C1 or AM1. Details about the demands are clarified in the first meeting.

In this seminar we will perform a close reading of Shaun Gallagher's recent book *Action and Interaction* (2020, OUP). The book consists of three parts, where the first part deals with demarcating 'actions', clarifying the temporal structure of actions, the meaning of actions and different senses of agency. The second part turns to 'interaction'. In this part Gallagher outlines his 'interaction theory' of social cognition and defends it from other mindreading approaches to social cognition. Finally, in part three, Gallagher explores the implications of the first two parts for thinking about how we as agents are shaped by our social practices and institutions. The ultimate goal of the book is to have a clearer understanding of autonomous agency and morally responsible action.

The book contains a treasure trove of interesting ideas, and Gallagher substantiates his analyses by drawing on diverse fields such as philosophy of action, embodied and enactive cognitive science, hermeneutic phenomenology, and critical social theory. No substantial background knowledge in these fields is required. Where necessary the lecturer will provide background information.

After an introductory session, each subsequent session will be devoted to discussing a chapter of the book. Ideally, towards the end of the semester Prof. Gallagher will be invited for an online session so that the students may interact directly with the author of this book.

Literature:

Shaun Gallagher (2020). *Action and Interaction*. Oxford University Press.

I recommend the students to obtain this book before or immediately after starting the seminar (please consider possible delays of delivery)

BLOCK SEMINAR

INTRODUCTION INTO STATISTICAL ANALYSES USING R
(119216)

PETER HÄHNER, M.SC.

TERM:	Winter 2021/22
MEETING TIME:	First Meeting: 22.10.2021, 16.00 – 17.00; Following sessions – see below
ROOM:	Online
CP:	3

In the course of the seminar, students will learn to perform data analyses with R including steps of

- data management (calculating variables, import or export datasets, etc.)
- descriptive data analyses (calculating mean values, standard deviations, etc.)
- inferential data analyses (t-test, correlation, linear regression)
- creation of graphs

The seminar will be held online (via Zoom) with the following elements:

- Organizational meeting (Friday, 22.10.21: 16:00 – 17:00): Information on structure, deadlines, and requirements for course credit
- On-demand videos with input on data analysis using R (should be watched between sessions)
- Synchronous sessions (Saturday, 13.11.21, Saturday, 11.12.21, and Saturday, 15.01.22: each 9:00 – 17:00): Opportunity to ask questions, presentation of examples, working on exercise sheets

To receive course credit, participants will have to work on exercise sheets and Moodle tests.

Prerequisites: Participants are expected to have a basic knowledge of descriptive (mean, standard deviation, correlation, regression) and inferential statistics (p-values, distributions) before starting the seminar.

Sessions:

Fri (22.10.21) 16:00 – 17:00 (organizational meeting)

Sat (13.11.21) 9:00 – 17:00

Sat (11.12.21) 9:00 – 17:00

Sat (15.01.22) 9:00 – 17:00

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 Genc (erhan.genc@rub.de).

Further advanced methods can be found in the program from the last summer semester on our webpage: https://philosophy-cognition.com/mcs/wp-content/uploads/2021/03/mcs_courseguide_ss2021-2.pdf. They will again be offered in the upcoming summer semester.

*PRACTICAL COURSE***NEUROPSYCHOLOGICAL METHODS: fMRI (118519)**

DR. ERHAN GENC

TERM:	Winter 2021/22
MEETING TIME:	First Meeting: 04.10.2021, 18.00; following sessions – see below
ROOM:	IB 02/109 (PC-Pool) (In Person)
CP:	tba

Practical course and seminar have to be attended both together. They cannot be taken individually. Please also see remarks for AM7 above.

This practical course can only be taken in combination with the seminar. 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 fiber 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.

Sessions:

Mon (04.10.2021), 18:00, via Zoom

Sun (07.11.2021), 10:00 to 18:00, IB 02/109. PC-Pool*

Mon (08.11.2021), 10:00 to 18:00, IB 02/109. PC-Pool

Sun (14.11.2021), 10:00 to 18:00, IB 02/109. PC-Pool*

Mon (15.11.2021), 10:00 to 18:00, IB 02/109. PC-Pool

*Meeting point on Sundays: In front of the IB building

*BLOCK SEMINAR***NEUROPSYCHOLOGICAL METHODS: fMRI (118518)**

DR. ERHAN GENC

TERM:	Winter 2021/22
MEETING TIME:	First Meeting: 04.10.2021, 18.00; following sessions – see below
ROOM:	IB 02/109 (PC-Pool) (In Person)
CP:	tba

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. 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 via online registration if interested.

Sessions:

Mon (04.10.2021), 18:00, via Zoom

Sun (07.11.2021), 10:00 to 18:00, IB 02/109. PC-Pool*

Mon (08.11.2021), 10:00 to 18:00, IB 02/109. PC-Pool

Sun (14.11.2021), 10:00 to 18:00, IB 02/109. PC-Pool*

Mon (15.11.2021), 10:00 to 18:00, IB 02/109. PC-Pool

*Meeting point on Sundays: In front of the IB building

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 Dr. Alfredo Vernazzani or Prof. Dr. Albert Newen. Students are only allowed to take maximally three German courses in the whole program up to maximally 12 credit points.

D1		Free Selection
		<i>LECTURE</i> STRESS (117031) PROF. DR. OLIVER T. WOLF
TERM:	Winter 2021/22	
MEETING TIME:	Monday, 12 – 14 (First Meeting: 18.10.2021)	
ROOM:	HIA	
CP:	3	

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, der Psychoneuroimmunologie und den affektiven und kognitiven Neurowissenschaften besprochen.

*LECTURE***LERNEN (112231)**

PROF. DR. ONUR GÜNTÜRKÜN

TERM:	Winter 2021/22
MEETING TIME:	Thursday, 16 – 18 (First Meeting: 21.10.2021)
ROOM:	HIA
CP:	3

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

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

PROF. DR. NIKOLAI AXMACHER

TERM:	Winter 2021/22
MEETING TIME:	Wednesday, 08.30 – 10.00 (First meeting: 20.10.2021)
ROOM:	HIA
CP:	3

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. MARLIES PINNOW

TERM:	Winter 2021/22
MEETING TIME:	Monday, 16 – 18 (First meeting: 18.10.2021)
ROOM:	HIA
CP:	3

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.
Schmalt, H.-D. & Langens, T. A. (2009): *Motivation* (4. vollständig überarbeitete Auflage). Stuttgart: Kohlhammer
Heckhausen, J. & Heckhausen, H. (2010): *Motivation und Handeln* (4. Auflage). Berlin: Springer.

SEMINAR

ÜBERWACHUNG IM DIGITALEN ZEITALTER (030098)

JUN-PROF. DR. SEBASTIAN WEYDNER-VOLKMANN

TERM:	Winter 2021/22
MEETING TIME:	Tuesday, 14 – 16 (First meeting 12.10.2021)
ROOM:	GABF 04/716
CP:	3

Gegenstand des Seminars bilden vernetzte Überwachungs- und Kontrolltechniken und deren Einfluss auf Demokratie und Autonomie. Es soll der Frage nachgegangen werden, wie in der praktischen Philosophie ein bewertender Zugriff auf diese Techniken gelingen kann. Hierzu werden wir uns insbesondere mit Theorien der Überwachungsforschung sowie dem neueren Feld der Digital-Ethiken auseinandersetzen.

Das Seminar richtet sich an fortgeschrittene Studierende im BA und MA. Staatsphilosophische Grundlagenkenntnisse (etwa zu den Vertragstheorien von Hobbes und Locke) werden vorausgesetzt.

Organisatorischer Hinweis:

Das Seminar wird wechselnd synchrone Elemente (je nach Situation in Präsenz oder über Zoom) und asynchrone Elemente (Aufgabenbearbeitung über Moodle) nutzen. Die Seminarliteratur wird über Moodle bereitgestellt.

*SEMINAR***STRESS UND KOGNITION (118032)**

PD DR. CHRISTIAN MERZ

TERM:	Winter 2021/22
MEETING TIME:	Tuesday 12 – 14 (First Meeting: 19.10.2021)
ROOM:	IA 02/461
CP:	3

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.

SECOND YEAR PROGRAM

I. Interdisciplinary Research Module

Choosing a course from C1 - C4 as a substitute for I1 - I4 is only possible if the substitute course is closely connected to the master thesis project.

I1

I1. Cognitive Philosophy

COLLOQUIUM

EXTRA RESEARCH COLLOQUIUM "METAPHILOSOPHY AND EXPERIMENTAL PHILOSOPHY" (030128)

JUN-PROF. DR. JOACHIM HORVATH

TERM:	Winter 2021/22
MEETING TIME:	Wednesday, 16 – 18 (First Meeting: 13.10.2021)
ROOM:	GAFO 04/619
CP:	3 or 6

In this research colloquium, we will discuss current topics from metaphilosophy and experimental philosophy, broadly construed. The colloquium will also host talks by a number of external guests, many of which are leading experts in their field. Students at the master or doctoral level will be given the opportunity to present their work in English.

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

PROF. DR. MARKUS WERNING
IN COOPERATION WITH: DR. KRISTINA LIEFKE (BOCHUM),
PROF. DR. KOURKEN MICHAELIAN (GRENOBLE),
DR. ERICA COSENTINO (BOCHUM), AND
DR. ANCO PEETERS (BOCHUM)

TERM:	Winter 2021/22
MEETING TIME:	Thursday, 16 – 19 (First Meeting: 14.10.2021)
ROOM:	Hybrid (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”. The memory talks will be organized in cooperation with Prof. Kourken Michaelian, Dr. Erica Cosentino, and Dr. Anco Peeters. The language talks will be hosted together with Prof. Kristina Liefke. A detailed schedule will be published in due course at <https://www.ruhr-uni-bochum.de/phil-lang/colloquium.html>. With few exceptions, talks will be held via Zoom and will be open to the international academic public.

Please register on e-Campus for all further information.

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

PROF. DR. ALBERT NEWEN, DR. SABRINA CONINX, M.A.

TERM:	Winter 2021/22
MEETING TIME:	Tuesday, 14 – 16 (First Meeting: 12.10.2021)
ROOM:	GA 04/187
CP:	3 or 6

The colloquium is organized for PhD students and for advanced Master Students only who are already working on their Master thesis. 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 the self or the perception-cognition divide.

PhD-students who are interested in presentations should write an email to both organizers (albert.newen@rub.de and sabrina.coninx@rub.de) and come to the first meeting.. Master students can receive 4 CP for a presentation in the colloquium (in the case of an additional essay, Master students can receive 6 CP).

The presentations in the colloquium and the discussion will be in English.

*SEMINAR***BEING A PERSON AND UNDERSTANDING OTHER PERSONS
(030104)**

PROF. DR. ALBERT NEWEN, PROF. DR. KATJA CRONE (TU DORTMUND)

TERM:	Winter 2021/22
MEETING TIME:	Monday, 16 – 18 (First Meeting: 11.10.2021)
ROOM:	Hybrid (Mainly online, partially in person: GA 3/143.)
CP:	3 or 6

In this seminar, we will explore the relation between personhood and the ability to understand other persons.

In the first part of the course, we will turn to the concept of a person. What is constitutive for persons, and what distinguishes a person from a non-person? We will take a closer look at some central characteristics such as self-awareness, (moral) agency, and the ability to entertain a self-narrative and to have a self-concept. Also, we will discuss the role social groups and society in general play in establishing beings as persons.

In the second part of the seminar, we will focus on the question of what it means to recognize and to understand other persons in the light of some of the previously explored person-making characteristics. We start with an overview of the classical positions of Theory-Theory and Simulation Theory. We then turn to more recent approaches such as the Interaction Theory and the Person Model Theory. In addition to theoretical overview articles, we will also select some articles discussing psychological evidence about understanding others including low-level perceptual information as well as high-level linguistic information from others. The aim of the seminar is to combine the question of personhood with the question of social cognition such that we are able to outline a unified perspective of both phenomena.

The course will be organized as a hybrid course. Participation can also be realized completely online. But we plan a meeting in person every two weeks. We change the place of the seminar meeting each time and will let the participants know when it is in Bochum and when in Dortmund. Both universities can be reached by public transport within 40 minutes (from mid campus to mid campus).

*COLLOQUIUM***SCIENTIFIC COLLOQUIUM: COGNITIVE PSYCHOLOGY AND
PSYCHONEUROENDOCRINOLOGY (115113)**

PROF. OLIVER T. WOLF

TERM:	Winter 2021/22
MEETING TIME:	Tuesday, 16.00 – 18.00 (First Meeting: 19.10.2021)
ROOM:	IA 02/460
CP:	3

In this forum, scientific projects (i.e. Master and PhD projects) of the Cognitive Psychology work group will be presented. The main focus is on experimental stress studies. Here we will try to answer the questions, “what makes us stressed” and “how does stress affects our cognitive skills”. In addition, invited guests from our faculty, from other faculties of the RUB and from other universities world wild will pre-sent their current research findings on topics that relate to cognitive psychology or psychoneuroendocrinology.

An overview of the schedule will be available on the AE homepage at the beginning of the semester.

The seminar will be held in the English language.

Students in the 3rd semester who think about conducting their master thesis with our AE can participate.

SEMINAR

JOURNAL CLUB: NEUROPSYCHOANALYSE (118915)

PROF. NIKOLAI AXMACHER

TERM:	Winter 2021/22
MEETING TIME:	Thursday, 16 – 18 (First Meeting: 21.10.2021)
ROOM:	IB 6/127
CP:	3

In Analogie zu den Kognitiven Neurowissenschaften - der Untersuchung der neuronalen Korrelate kognitiven Prozesse - wurden in den letzten Jahren auch Konzepte der Psychoanalyse mit bildgebenden Methoden untersucht. Inhalt der Veranstaltung ist die Vorstellung laufender Forschungsarbeiten der Arbeits-einheit Neuropsychologie sowie Vorträge der Gastdozenten zu klinisch-neuropsychologischen Themen. Dabei werden aktuelle Untersuchungen zu zentralen psychoanalytischen Konzepten (Verdrängung, Kon-version, Träume, Traumatisierung...), aber auch Studien zu den Mechanismen der psychodynamischen Psychotherapie sowie psychodynamische Konzeptualisierungen neuropsychologischer Symptome vorge-stellt 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. Daher ist eine regelmäßige Anwesenheit im Umfang von mindestens zwei Dritteln der Termine notwendig. Ein Zeitplan mit Informationen über die Themen und Referenten wird zu Beginn des WS per Aushang bekannt gegeben.

Auch unter: <http://www.ruhr-uni-bochum.de/neuropsy/>

*SEMINAR***JOURNAL CLUB: STRESS UND KOGNITION (118910)**

PROF. DR. OLIVER T. WOLF

TERM:	Winter 2021/22
MEETING TIME:	Wednesday, 12 – 14 (First Meeting: 06.10.2021)
ROOM:	IB 6/127
CP:	3

In der Veranstaltung werden aktuelle englischsprachige Zeitschriftenartikel zum Themenbereich Stress und kognitive Prozesse vorgestellt und kritisch diskutiert.

*LECTURE & EXERCISE***MACHINE LEARNING: UNSUPERVISED METHODS****(310003 & 310013)**

PROF. DR. LAURENZ WISKOTT

TERM:	Winter 2021/22
LECTURE:	Tuesday, 12 – 14 (First Meeting: 12.10.2021)
EXERCISE:	Tuesday, 10.30 – 12 (First Meeting: 12.10.2021)
ROOM:	Online
CP:	6

Goals:

- (i) The students should get to know a number of unsupervised learning methods.
- (ii) They should be able to discuss which of the methods might be appropriate for a given data set.
- (iii) They should understand the mathematics of these methods.

This course covers a variety of unsupervised methods from machine learning such as principal component analysis, independent component analysis, vector quantization, clustering, self-organizing maps, growing neural gas, Bayesian theory and graphical models. We will also briefly discuss reinforcement learning.

The mathematical level of the course is mixed but generally high. The tutorial is almost entirely mathematical. Mathematics required include calculus (functions, derivatives, integrals, differential equations, etc), linear algebra (vectors, matrices, inner product, orthogonal vectors, basis systems, etc), and a bit of probability theory (probabilities, probability densities, Bayes' theorem, etc).

*COLLOQUIUM***JOURNAL CLUB: LEARNING AND MEMORY (310026)**

PROF. DR. SEN CHENG

TERM:	Winter 2021/22
MEETING TIME	Tuesday, 14 – 16 (First Meeting: 12.10.2021)
ROOM:	Online
CP:	3

We will focus on the neural basis of learning and memory at the systems level. In each 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. Sen Cheng, NB 3/33, sen.cheng@rub.de

Capacity: max. 15 students

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

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

TERM:	Winter 2021/22
LECTURE:	Friday, 10 – 12 (First meeting: 08.10.2021)
ROOM:	IB 6/127
CP:	3

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.

*COLLOQUIUM***RESEARCH COLLOQUIUM NEUROPSYCHOLOGY (118916)**

PROF. DR. NIKOLAI AXMACHER

TERM:	Winter 2021/22
MEETING TIME:	Thursday 14 – 16 (First meeting: 21.10.2021)
ROOM:	IB 6/127 or Online
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/neuropsych/> 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.