

Course Guide – Master Cognitive Science

Winter 2017/18

04.09.2017

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Enrollment for Courses

Students in the first semester will be registered by the lecturers in the first session of each course. Advanced students (from the second semester on) are requested to register with the university's **VSPL**-system (info: vspl-support@rub.de) and should be aware of earlier VSPL-deadlines. Exceptions include the courses held by Wiskott, Schöner and Würtz. Here, there will be **no VSPL-registration**, but a manual enrollment in the first session.

FIRST YEAR PROGRAM

Every student is strongly recommended to participate in the preparatory courses. Exceptions have to be approved by Dr. Tobias Starzak (tobias.starzak@rub.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.

Additional Courses

Every student is strongly recommended to consider participation in the following new additional courses:

C2.

Perception & Action

SEMINAR

PHILOSOPHY OF PERCEPTION (030 095)

J. PROF. PETER BRÖSSEL

TERM:	Winter 2017/18
MEETING TIME:	Thursday 10-12 (First Meeting: 12.10.2017)
ROOM:	GA 04/187
CP:	6

This research seminar discusses current topics in the philosophy of perception and it concentrates on debates at the intersection between Epistemology and Cognitive Science. In this seminar we will discuss foundational articles in the mentioned areas as well as research papers by members of the department and the Emmy Noether Research Group "From Percep-

tion to Belief and Back Again". In addition, students will have the opportunity to present a paper on a topic related to the philosophy of perception and/or epistemology. Requirement for participation is a strong background in analytic epistemology and acquaintance with formal methods (logic, probability theory) in philosophy.

*SEMINAR***PREDICTIVE PROCESSING: PERCEPTION AND OTHER APPLICATIONS****(030 051)**

DR. LENA KÄSTNER

TERM:	Winter 2017/18
MEETING TIME:	Tuesday 12-14 (First Meeting: 10.10.2017)
ROOM:	GABF 04/709
CP:	6

Predictions are currently all over the place in neuroscience and philosophy. Over the last two decades or so, neuroscientists have developed a theory according to which the brain is a sophisticated hypothesis testing machinery that is constantly involved in predicting sensory information based on hierarchical generative models where the central aim is to minimize the error of these predictions. This approach is commonly referred to as Predictive Processing (PP). While the details vary depending on how exactly PP is spelled out, a central tenet of PP is that is meant to explain perception, cognition, and action singlehandedly. Whether we study visual perception, attention, memory, or delusions, PP arguably describes the mechanism that implements all of these phenomena. As such, it is a powerful

theoretical framework not only for neuroscientists aiming to understand the brain but also for philosophers aiming to understand the mind.

Throughout this course we will mainly focus on the version of PP proposed by Jakob Hohwy. We will be reading Hohwy's "The Predictive Mind" (2013) and discuss about, e.g., what claims PP makes exactly, how it applies to perception, whether and how it may be used to understand other phenomena (e.g. delusions in psychiatry), how we should conceive of the mind according to PP, whether PP is a genuine theory or whether PP describes a concrete mechanism, and how PP squares with other (situated) approaches to cognition.

Preparatory Courses

Academic English

SEMINAR

ENGLISH FOR MASTER COGNITIVE SCIENCE (251 211)

ANNA SOLTYSKA

TERM: Winter 2017/18
MEETING TIME: September 22 – October 6, 8.30 – 10.30
ROOM: GA 03/140

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 focuses 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 Blackboard/Moodle component to enhance classroom teaching and self-study at home.

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 (119 212)

JAMOL BAHROMOV

TERM: Winter 2017/18
MEETING TIME: September 22 – October 6: 11.00 – 14.30
ROOM: GAFO 04/615 ("Medienraum")

"Biostatistics" will cover the basic statistical methods used by researchers in the life sciences to collect, summarize, analyze, and draw

conclusions from data. The topics include descriptive statistics, univariate statistical tests, and experimental design.

A1. Introduction to Cognitive Science

A1.

A1. Introduction to Cognitive Science

OBLIGATORY FOR EVERY FIRST YEAR STUDENT

LECTURE & SEMINAR

INTRODUCTION TO COGNITIVE SCIENCE (LECTURE 030 007)

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

TERM:	Winter 2017/18
LECTURE:	Wednesday, 10 – 12 (First Meeting: 11.10.2017)
ROOM:	GA04/187
SEMINAR:	Wednesday, 12 – 14 (First Meeting: 11.10.2017) Please notice: The seminar will have some modified times to be announced at the first meeting
ROOM:	GAFO 05/425
CP:	6

Attention:

- The time of the lecture will not vary but the time of the seminar will vary somewhat: The details of the seminar 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 course has the aim to deliver important basic knowledge from empirical sciences in the framework of theory formation. The credit points are delivered on the basis of a written examination and of some active work in the obligatory additional seminar.

The structure of the lecture:

1. Introduction: History of Cognitive Science
- 2 Basic Concepts in Cognitive Science
- 3 Cognitive Neuroscience of Perception
- 4 Modeling Vision
- 5 Consciousness of Perception
- 6 Development of Vision
- 7 Enacted and Embodied Cognition
- 8 Models of Motor Control
- 9 Cognitive Neuroscience of Emotion
- 10 Theories of Emotion
- 11 Psychology of Learning
- 12 Cognitive Neuroscience of Memory
- 13 Models of Learning and Memory
- 14 Social Cognition: Evolution, Development, Pathology

BM. Basic Methods

Students are expected to learn (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. Tobias Starzak (tobias.starzak@rub.de) or by Prof. Dr. Albert Newen (albert.newen@rub.de).

BM1.

BM1. Experimental Psychology Lab

SEMINAR

EXPERIMENTAL PSYCHOLOGICAL LAB (119 213)

DR. SIMON E. BLACKWELL

TERM:	Winter 2017/18
MEETING TIME:	Thursday 12-14 (First meeting: 12.10.2017)
ROOM:	GAFO 02/365.
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 analyze the data.

As a result, all participants will write a first scientific report. The lab course will be held in small groups.

*SEMINAR***LOGIC: INTRODUCTORY COURSE (030 041)**

DR. PERE PARDO VENTURA

TERM:	Winter 2017/18
MEETING TIME:	Tuesday, 12-14 (First meeting: 10.10.2017)
ROOM:	GABF 04/358
CP:	4

This course offers an elementary introduction to classical logic from a philosophical perspective. Students will get familiarized with the formal languages of propositional and predicate logic. The meaning of logical connectives ("and", "or", "implies", "not") and quantifiers ("for all", "there is a") will be discussed in terms of their model-theoretic semantics. A formal proof method will be introduced. A part of the course will be devoted to practical exercises. In this way students have the opportunity to internalize and consolidate their theoretical insights.

A precondition for receiving a certificate is 1.) to submit weekly homework regularly and 2.) to

pass the written exam at the end of the course. The certificate can be with or without grade (dependent on the amount of work).

For literature besides the script (which will be available via the moodle online portal), see e.g.,
- Graeme Forbes: Modern Logic. Oxford University Press, 1994.

- Wesley C. Salmon: Logik. Reclam, 1983.

- Theodor Sider, Logic for Philosophy, Oxford University Press, 2010.

- Dirk Van Dalen, Logic and Structure, Springer, 2004

- Raymond M. Smullyan, Logical Labyrinths, A K Peters Ltd, Wellesley, MA, 2009

General Remark Concerning BM3 – Neural Networks

A basic course in neural networks is obligatory. The course of Prof. Cheng is the standard course for the students in Cognitive Science. If you are coming with more background in mathematics you feel free to choose other offers. Students only have to pass one course in BM3.

BM3.

BM3. Neural Networks

SEMINAR

COMPUTATIONAL COGNITIVE MODELING (310 024)

PROF. SEN CHENG

TERM:	Winter 2017/18
MEETING TIME:	Monday, 14-16 (First Meeting: 16.10.2017)
ROOM:	NB 3/57
CP:	3
	Max. 20 students

The human mind is most intimately familiar to us, yet we understand very little about how it functions. To study the mind, the field of cognitive science pursues an interdisciplinary approach. One of the pillars of cognitive science is computational modeling. This seminar will survey models of perception, memory and action. Rather than focusing on the mathematical details, we will discuss the motivation, application and noteworthy properties of the models, including their strengths and shortcomings. Class work will include student presentations and discussions. The topics will be assigned to the students in the first meeting.

Prerequisites: Basic knowledge of cognition e.g., "Cognition I + II", "Learning".

Assessment: Presentation in class

Course material: Moodle (sign-up required)

Textbook: "The Cambridge Handbook of Computational Psychology" edited by Ron Sun, Cambridge University Press
+ modeling papers announced in class

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

*LECTURE & EXERCISE***COMPUTATIONAL NEUROSCIENCE – NEURAL DYNAMICS****(310 001 & 310 011)**

PROF. GREGOR SCHÖNER

TERM:	Winter 2017/18
LECTURE:	Thursday, 14 – 16 (First Meeting: 12.10. 2017)
ROOM:	NB 3/57
EXERCISE:	Thursday, 16.15 – 17.00 (First Meeting: 19.10.2017)
ROOM:	NB 3/57
CP:	6

This course provides an introduction into the theoretical behavioral and functional neurosciences from a particular theoretical vantage point, the dynamical systems approach. This approach emphasizes the evolution in time of behavioral and neural patterns as the basis of their analysis and synthesis. Dynamic stability, a concept shared with the classical biological cybernetics framework, is one cornerstone of the approach. Instabilities (or bifurcations) extend this framework and provide a basis for understanding flexibility, task specific adjustment, adaptation, and learning.

The course will include tutorial modules that provide mathematical foundations. Theoretical

concepts will be exposed in reference to a number of experimental model systems which will include the coordination of movement, postural and configurational stability, the perception of motion, and elementary forms of spatial cognition. In the spirit of Braitenberg's "synthetic psychology", autonomous robots will be used to illustrate some of the ideas.

Exercises will be integrated into the lectures. They will consist of elementary mathematical exercises, the design of (thought) experiments and their analysis, and the design of simple artificial systems, all on the basis of the theoretical framework exposed in the main lectures.

*LECTURE***CLINICAL NEUROPSYCHOLOGY (112 621)**

PROF. BORIS SUCHAN

TERM:	Winter 2017/18
MEETING TIME:	Tuesday, 10.00 – 12.00 (First Meeting: 10.10.2017) Exam: Tuesday, 20.03.2018, 10-12 HGA 20
ROOM:	GAFO 02/364
CP:	3

Aim of this lecture is to get an insight in the organization of the human brain, functional neuroanatomy and neuropsychology. Starting with an overview of basic methods used in neuroscience, the full brain starting at the occipital lobe and ending at the frontal lobe will be explored with respect to its functional organization. Be-

side functional organization, neuropsychological syndromes like neglect apraxia and amnesia will be discussed.

Literature:

Kolb & Wishaw: Fundamentals in human neuropsychology.

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

C. Topics Selection

C1.

C1. Social Cognition & Meta-Science

SEMINAR

THOUGHT IN A HOSTILE WORLD.

THE EVOLUTION OF HUMAN COGNITION (030 084)

DR. TOBIAS STARZAK

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 14-16 (First Meeting: 10.10.2017)
ROOM:	GA 3/143
CP:	6

Kim Sterelny's ambitious book *Thought in a hostile world* (Blackwell, 2003) pursues four goals: it aims to develop analytic tools for thinking about cognition and its evolution, to develop a theory of human uniqueness, explore the relationship between so-called folk-psychology and an integrated scientific conception of human cognition, and present an alternative to nativist,

modular versions of evolutionary psychology. In the seminar we'll read and critically discuss selected parts of the book covering all four topics.

Literature: Sterelny, K. (2003). *Thought in a hostile world. The evolution of human cognition.* Blackwell.

SEMINAR

UNDERSTANDING ONESELF AND UNDERSTANDING OTHERS
(030 086)

PROF. ALBERT NEWEN

TERM:	Winter 2017/18
MEETING TIME:	Tuesday, 8:30 – 10:00 (First Meeting: 10.10.2017)
ROOM:	GA 04/187
CP:	6

This seminar is a research-oriented seminar which especially enables the participants to develop a project which leads into a BA-thesis or a master-thesis. It has a focus in philosophy but will involve some psychological texts as well. The main topic is the discussion of modern theories of human self-consciousness and of understanding others. Self-consciousness can be defined as the ability to consciously represent one's own states, especially (but not only) mental states, as one's own (Newen, Voegeley 2003). Concerning self-consciousness, we can distinguish four central questions which allow us to illustrate the wide range of this central debate:

The epistemological question: Do we have a privileged access to our own mental phenomena such that only we can know with certainty which mental phenomena we have?

The ontological question: Is there a self as an ontologically irreducible entity?

The cognitive question: How can we investigate the natural basis of self-c. with the methods of empirical psychology and cognitive neuroscience?

The question about personal identity: What is the criterion of being a person and of remaining the same person? In the seminar we will discuss texts concerning the first three dimensions of human self-consciousness.

Since the working hypothesis is that self-understanding and understanding others are two sides of the same coin, we will discuss theories of understanding others in the second part of the seminar: For decades we had an intense debate between Theory-Theory (TT) and Simulation-Theory (ST). The central claim of TT is that the process of understanding others is essentially relying on a theory. Simulation-Theory (ST) claims that we understand other by putting "ourselves into the shoes of the other". We will discuss the main deficits of these theories. Then we will discuss more recent developments in theories of understanding other, e.g. the theory of direct perception (Shaun Gallagher 2008), the narrative theory (Dan Hutto 2008) and the person model theory (Newen/Schlicht 2009). A leading background question is whether we can systematically develop the bridges between understanding oneself and understanding others.

Details for receiving a certificate will be presented at the beginning of the seminar. Bachelor-students will receive 4 credit points for a determined package of work while master students will receive 6 credit points for a higher workload. The workload involves the standard tools of oral presentations and essay writing. Presentations and discussions will be in English.

To prepare the participation please read the following texts:

Gallagher, S., Zahavi, D.: Phenomenological Approaches to Self-Consciousness, in: Stanford Encyclopedia of Philosophy,

<http://plato.stanford.edu/entries/self-consciousness-phenomenological/>

Literature: The articles and the seminar plan will be available via moodle for the participants.

*SEMINAR***PREDICTIVE PROCESSING: PERCEPTION AND OTHER APPLICATIONS****(030 051)**

DR. LENA KÄSTNER

TERM:	Winter 2017/18
MEETING TIME:	Tuesday 12-14 (First Meeting: 10.10.2017)
ROOM:	GABF 04/709
CP:	6

Predictions are currently all over the place in neuroscience and philosophy. Over the last two decades or so, neuroscientists have developed a theory according to which the brain is a sophisticated hypothesis testing machinery that is constantly involved in predicting sensory information based on hierarchical generative models where the central aim is to minimize the error of these predictions. This approach is commonly referred to as Predictive Processing (PP). While the details vary depending on how exactly PP is spelled out, a central tenet of PP is that is meant to explain perception, cognition, and action singlehandedly. Whether we study visual perception, attention, memory, or delusions, PP arguably describes the mechanism that implements all of these phenomena. As such, it is a powerful

theoretical framework not only for neuroscientists aiming to understand the brain but also for philosophers aiming to understand the mind.

Throughout this course we will mainly focus on the version of PP proposed by Jakob Hohwy. We will be reading Hohwy's "The Predictive Mind" (2013) and discuss about, e.g., what claims PP makes exactly, how it applies to perception, whether and how it may be used to understand other phenomena (e.g. delusions in psychiatry), how we should conceive of the mind according to PP, whether PP is a genuine theory or whether PP describes a concrete mechanism, and how PP squares with other (situated) approaches to cognition.

*LECTURE & EXERCISE***ARTIFICIAL NEURAL NETWORKS (310 002 & 310 012)**

PD DR. ROLF WÜRTZ

TERM:	Winter 2017/18
LECTURE:	Friday, 12 – 14 (First Meeting: 13.10.2017)
ROOM:	HZO 100
EXERCISE:	Wednesday, 14 – 18 (1 hour groups), (First Meeting: 11.10.2017)
ROOM:	ND 3/99
CP:	5

This lecture presents standard algorithms and new developments of feedforward Artificial Neural Networks, their functioning, application domains, and connections to more conventional mathematical methods. Examples show the potential and limitations of the methods. Supervised as well as unsupervised learning methods are introduced. In detail:

- 1) Introduction, some biological facts
- 2) Mathematical foundations: probability theory and partial derivatives
- 3) One layer networks and linear discriminants
- 4) Multilayer networks and error backpropagation

- 5) Universality of two-layer networks
- 6) Radial basis function networks
- 7) Neuronal maps: Kohonen network, Growing Neural Gas
- 8) Optimization methods

Learning objectives:

Theoretical understanding of feedforward neural networks, practical skills in computer implementations

Soft skills:

Each student must present the results of one exercise.

Individual competences:

Programming selected routines in C++, theoretical understanding of feedforward Neural Networks

LECTURE

INTRODUCTION TO PERCEPTION (310 006)

PROF. SEN CHENG

TERM:	Winter 2017/18
MEETING TIME:	Monday, 10 – 12 (First Meeting: 16.10.2017)
ROOM:	GA 04/187
CP:	3

Perception of sensory inputs can be studied along three different dimensions: modality, description level and methodology. This lecture will discuss several different examples along each dimension and highlight common principles, when possible. Modalities include, for instance, vision, audition, olfaction and proprioception. The description level will range from receptor physiology to Gestalt psychology. The methodology will include psychophysics, electrophysiology and computational modeling.

Prerequisite: *[no special prerequisite]*

Assessment: final exam

Attendance: optional, but highly recommended

Course material: Moodle (sign-up required)

Textbook: Sensation and Perception by E. Bruce Goldstein, 8th or 9th ed, Wadsworth

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

*LECTURE***THE NEURAL BASIS OF VISION (310 025)**

PROF. SEN CHENG, DR. AMIR AZIZI

TERM:	Winter 2017/18
MEETING TIME:	Friday, 10 – 12 (First Meeting: 20.10.2017)
ROOM:	GA 04/187
CP:	3
	Max. 20 students

Of all modalities vision is best studied, perhaps due to the dominance of the visual sense in humans. Even so much is still unknown about the neural basis of vision and visual plasticity. The goal of this seminar is to introduce students to the classic and current research literature. Therefore, a range of experimental approaches will be covered, including electrophysiology and imaging techniques such as fMRI, EEG and MEG. The topics will be assigned to the students in the first meeting.

Enrollment: VSPL, max. 20 students

Assessment: presentation in class

Attendance: mandatory, min. 66%

Course material: Moodle (sign-up required)

Contact:

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

Dr. Amir Azizi, NB 3/70, amir.azizi@rub.de

ONE-WEEK INTERNSHIP
AUTONOMOUS ROBOTICS (310 036)
M. SC. MATHIS RICHTER

TERM:	Winter 2017/18
MEETING TIME:	2018, FEBRUARY 19.-23. (Preliminary meeting: 2018, February 1, 10.15h, NB 3/57)
ROOM:	NB 02/77
CP:	3

The practical course gives an introduction to mobile robotics with a focus on dynamical systems approaches. In the exercises, the computing environment Matlab 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.

Interested students who do not have experience in Matlab should attend the Matlab introduction of the lab exercise Computer Vision (typically the week before this course). Details about availability and credit points have to be clarified early via email.

Contact: mathis.richter@ini.rub.de

Enrollment: 01.12.2017-12.01.2018 e-mail
mathis.richter@ini.rub.de

*LECTURE***LEFT BRAIN - RIGHT BRAIN (118 111)**

PROF. ONUR GÜNTÜRKÜN

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 12– 14 (First meeting: 19.10.2017) Exam: 19.03.2018, 16 – 18, HGA 10
ROOM:	GAFO 03/252
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 hemi-

spheres. 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***PHILOSOPHY OF PERCEPTION (TBC)**

J. PROF. PETER BRÖSSEL

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 10-12 (First Meeting: 12.10.2017)
ROOM:	GA 04/187
CP:	6

This research seminar discusses current topics in the philosophy of perception and it concentrates on debates at the intersection between Epistemology and Cognitive Science. In this seminar we will discuss foundational articles in the mentioned areas as well as research papers by members of the department and the Emmy Noether Research Group "From Percep-

tion to Belief and Back Again". In addition, students will have the opportunity to present a paper on a topic related to the philosophy of perception and/or epistemology. Requirement for participation is a strong background in analytic epistemology and acquaintance with formal methods (logic, probability theory) in philosophy.

SEMINAR

THE PHILOSOPHY OF COLORS, SOUNDS AND TASTES (030 093)

PROF. MARKUS WERNING

TERM:	Winter 2017/18
MEETING TIME:	Tuesday 16-18 (First Meeting: 10.10.2017)
ROOM:	GA 04/187
CP:	6

Colors, sounds and tastes accompany us from earliest childhood on and belong to the most familiar things we know. But what are colors, sounds and tastes? Do they even exist? Is there a sense in which we can conceive of them as existing in a mind-independent way even if what they are depends on the structure of the human perceptual system? Do facts about colors, sounds and tastes supervene on physical facts? Does the experience of an object having a certain color or an event making a certain sound add anything new to our knowledge of the physical world? How do those puzzles regarding the metaphysics and epistemology of colors, sounds and tastes relate to psychological and neuroscientific findings?

Another topic of the seminar will be the cross-modal interaction between colors, sounds and tastes. Why are there loud colors, dark sounds and sweet tunes? Aside from linguistic exam-

ples of synesthetic metaphors, we will also discuss the phenomenon of synesthetic perception and the interaction of action and perceptual domains.

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

Readings:

Nudds, N., & O'Callaghan, C., (Eds). *Sounds & Perception: New Philosophical Essays*. Oxford, 2009: OUP.

Byrne, A. & Hilbert, D. (Eds.) *Readings on Color*. (Vol. 1+2.) Cambridge, MA, 1997: MIT Press.

Mroczko-Wąsowicz, A., & Werning, M. (2012). Synesthesia, Sensory-Motor Contingency, and Semantic Emulation: How Swimming Style-Color Synesthesia Challenges the Traditional View of Synesthesia. *Frontiers in Psychology*. <http://doi.org/10.3389/fpsyg.2012.00279>

SEMINAR

SELF-DECEPTION AND PREDICTIVE CODING (030 080)

DR. FRANCESCO MARCHI

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 10-12 (First Meeting: 12.10.2017)
ROOM:	GABF 04/609
CP:	6

In this seminar we will discuss a common variety of motivated and irrational route to belief formation and maintenance commonly known as Self-deception. According to several authors we often deceive ourselves about our own performance and skills. However, the possibility of Self-deception poses serious philosophical problems because it is thought to lead to paradox. We will examine the arguments behind this position and focus on one of the way to avoid the paradoxes, namely, the deflationary view. Afterwards, we will discuss how the deflationary view of Self-deception can be accommodated within the prediction-error minimization (PEM) framework for modelling cognition. As we shall discover, Self-deception may have an important function for adaptive behavior and it can happen according to four main strategies, each of which can be adequately modelled in the PEM framework.

Suggested literature:

Self-deception entry in the Stanford Encyclopedia of Philosophy. <https://plato.stanford.edu/entries/self-deception/>

Mele, A. R. (2001). *Self-Deception Unmasked*. Princeton University Press. (selected chapters)

Mele, A. R. (2004). MOTIVATED IRRATIONALITY. *The Oxford Handbook of Rationality* (pp. 240–255). Oxford University Press. <http://doi.org/10.1093/0195145399.003.0013>

McKay, R. T., & Dennett, D. C. (2009). The evolution of misbelief. *Behavioral and Brain Sciences*, 32(6), 493–510– discussion 510–61. <http://doi.org/10.1017/S0140525X09990975>

Lynch, K. (2012). On the “tension” inherent in self-deception. *Philosophical Psychology*, 25(3), 433–450. <http://doi.org/10.1080/09515089.2011.622364>

Nelkin, D. K. (2002). Self–Deception, Motivation, and the Desire to Believe. *Pacific Philosophical Quarterly*, 83(4), 384–406. <http://doi.org/10.1111/1468-0114.t01-1-00156>

Hohwy, J. (2013). *The Predictive Mind*. OUP Oxford. (selected chapters)

*SEMINAR***RADICAL ENACTIVISM AND HIGHER-LEVEL COGNITION****(030 083)**

PROF. TOBIAS SCHLICHT

TERM:	Winter 2017/18
MEETING TIME:	Tuesday, 10-12 (First Meeting: 10.10.2017)
ROOM:	GA 3/143
CP:	6

Enactivism is a view about cognition, according to which all cognition is essentially an activity, i.e. action-involving. It is also closely related to the claims that cognition is essentially embodied and embedded. Proponents of this view typically criticize the dominant representational approach to mental phenomena, calling for a paradigm shift in the cognitive sciences.

The basis of this seminar will be the book *Evolving Enactivism. How Basic Minds meet Content* (MIT Press 2017), written by Daniel D. Hutto (Wollongong) and Erik Myin (Antwerp). We will study this book and discuss it with the authors, at a workshop (December 4-6, 2017) at RUB in which Hutto and Myin will present and discuss their manuscript with us in the form of several talks. In this way, students can engage with state-of-the-art research.

About the book:

A powerful new chapter in the emerging radical enactivist story, this book supplies a positive account of how Hutto and Myin's revolutionary rethink of the roots of mentality can accommodate higher qualities of human cognition. Developing its duplex vision of mind, the book's detailed analyses show the gains of explaining cognitive phenomena –perceiving, imagining, remembering – as an interface between contentless and content-involving forms of cognition. Crucially, Hutto and Myin explicate how it is possible for contentful minds to arise, through socio-cultural scaffolding, without introducing mysterious gaps in nature. They give fundamental answers to questions about the production of representational meaning in relation to embedded, relational and dynamic forms of embodied engagement, both of which are paramount for understanding human culture.

The target group of the seminar are Master students both from Philosophy and cognitive science. Psychology students are very welcome. All interested students should have an interest in the topic, a reasonable command of the English language and some preliminary knowledge about cognitive science. The text will be supplied in the first session.

Introductory Literature:

D. Hutto, E. Myin: *Radicalizing Enactivism. Basic minds without content*. MIT Press 2012.

D. Hutto, E. Myin: *Evolving Enactivism. How basic minds meet content*. MIT Press 2017.

*SEMINAR***THE EVOLUTION OF HIGHER COGNITIVE FUNCTIONS IN
NON-HUMAN ANIMALS (112 615)**

DR. FELIX STRÖCKENS, SARAH VON EUGEN

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 12 - 14 (First Meeting: 19.10.2017) Max. 24 participants
ROOM:	GAFO 03/901
CP:	3

Humans represent without a doubt the pinnacle in the evolution of higher cognitive functions. However, other non-human animals, even outside the primate order, also possess surprisingly complex forms of higher cognition. Within this seminar, selected studies on the occurrence of such complex cognitive skills will be presented by students, focusing on species like chimpanzees, parrots, crows and dolphins. Furthermore, the seminar aims to clear up with some of the myths about what animals are capable of and what is beyond their reach. In addition to behavioral data, the seminar will also

deal with the question what the neuronal underpinnings of such skills are, and if there are any neuronal similarities between species expressing complex cognition. By dealing with these topics, participants of the seminar will get an overview of the cognitive abilities of non-human animals and learn that many of the cognitive skills considered unique to humans actually developed much earlier during evolution. The seminar will be held in English and students are required to give a talk on preselected literature.

*LECTURE & EXERCISE***MACHINE LEARNING: UNSUPERVISED METHODS
(310 003 & 310 013)**

PROF. LAURENZ WISKOTT

TERM:	Winter 2017/18
LECTURE:	Tuesday, 12.15 – 13.45 (First Meeting: 10.10.2017)
EXERCISE:	Tuesday, 9 – 12 (First Meeting: 17.10.2017)
ROOM:	NB 3/57
CP:	6

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. Criteria for a certificate for the tutorial are an active participation, in particular presentation of selected exercises, and at least 50% in the final exam.

*SEMINAR***EXERCISE LEARNING (112 240)**

DR. PATRICK ANSELME, M.SC. MENG GAO,
PROF. ONUR GÜNTÜRKÜN

TERM:	Winter 2017/18
MEETING TIME:	Tuesday, 14-16 (First Meeting: 24.10.2017) Max. 30 participants
ROOM:	GAFO 02/364
CP:	3

This practical participation-based course will provide an applied overview of the psychological foundations of learning and behaviour, touching on the neurophysiological basis of learning and memory processes with a view to potential applications in technology, therapy and other areas. Participants will present on various aspects of learning and behaviour such as habituation, sensitization, conditioning and extinction and place our understanding of these mechanisms in a relevant real-world context. This course will aim at an overview of general knowledge, as well as an in-depth look at early and current examples of research studies.

Learning Objectives

1. Acquire general content knowledge about the field of 'Learning' and 'Behaviour' within a psychological context.
2. Find, read and understand more specific in-depth knowledge related to content by looking at published experiments (primary source materials).
3. Comfortably, clearly and concisely present about both general and in-depth knowledge to peers.
4. Engage in classroom discussion, expanding upon and applying topics to experience.

SEMINAR

THE PHILOSOPHY OF PRAGMATICS (030 092)

PROF. MARKUS WERNING

TERM:	Winter 2017/18
MEETING TIME:	Wednesday, 12 – 14 (First Meeting: 11.10.2017)
ROOM:	GA 04/187
CP:	6

Traditionally, philosophers and linguists have distinguished between the semantics of a sentence, i.e., what the sentence means, and the pragmatics of an utterance, i.e., what a speaker means by uttering a sentence. Semantics was supposed to explain the intuitive truth-conditions of a sentence. An important constraint was the principle of compositionality according to which the meaning of a complex expression is determined by the meanings of its parts and the way they are combined. Pragmatics was supposed to concern only secondary processes such as implicatures or presuppositions that come with the utterance of a sentence.

More recently, however, this line of demarcation between semantics and pragmatics has been challenged. Truth-conditional pragmatists (Recanati, 2010) argue that pragmatic factors can modulate meaning at any stage of sentence meaning composition and thus have a direct influence on the intuitive truth conditions of sentences. Semantic minimalists (Borg, 2004, 2012), in contrast, defend the classical view of bottom-up compositionality. Most recently, this controversy has also been investigated within a probability-theoretic framework (Frank & Goodman, 2012) and with empirical methods such as EEG (Cosentino, Baggio, Kontinen, & Werning, 2017).

The seminar will explore the whole span of the philosophy of pragmatics from its beginnings

with Grice (1996a, 1996b) to the most recent debates.

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

Readings:

Borg, E. (2004). *Minimal Semantics*. Oxford: Clarendon Press.

Borg, E. (2012). *Pursuing Meaning*. Oxford University Press.

Cosentino, E., Baggio, G., Kontinen, J., & Werning, M. (2017). The time-course of sentence meaning composition. N400 effects of the interaction between context-induced and lexically stored affordances. *Frontiers in Psychology*, 8(818).
<http://doi.org/10.3389/fpsyg.2017.00813>

Frank, M. C., & Goodman, N. D. (2012). Predicting Pragmatic Reasoning in Language Games. *Science*, 336(6084), 998–998. <http://doi.org/10.1126/science.1218633>

Grice, H. P. (1996a). Meaning. In H. Geirsson & M. Losonsky (Eds.), *Readings in Language and Mind* (pp. 103–109). Oxford: Blackwell.

Grice, H. P. (1996b). Logic and Conversation. In H. Geirsson & M. Losonsky (Eds.), *Readings in Language and Mind* (pp. 121–133). Oxford: Blackwell.

Recanati, F. (2010). *Truth-Conditional Pragmatics*. Oxford University Press.

Werning, M., Hinzen, W., & Machery, M. (Eds., 2012). *The Oxford Handbook of Compositionality*. Oxford: Oxford University Press.

*SEMINAR***EMPIRICAL AND CONCEPTUAL APPROACHES TO REASONING
(030 087)**

DR. MATTHIAS UNTERHUBER

TERM:	Winter 2017/18
MEETING TIME:	Monday, 16-18 (First Meeting: 09.10.2017)
ROOM:	GA 04/187
CP:	6

The study of reasoning – which is closely related to thinking and problem solving – is an integral part of cognitive science. This seminar focuses on central paradigms in this area, such as the Wason selection task and the conditional inference paradigm. Both, empirical investigations and conceptual approaches to these paradigms, are discussed. This includes philosophical approaches, such as semantics for indicative and counterfactual conditionals, as well as accounts from psychology, such as mental model theory. Furthermore, students with a bachelor or master thesis project with a focus on reasoning (broadly construed) will have the opportunity to present and discuss their projects.

References

Over, D. (2004). *If*. Oxford: Oxford University Press.

Further literature references will be given in the first session.

AM. Advanced Methods

Advanced methods are usually studied in the second semester. The following two courses are exceptions, while the "fMRI"-course is only offered in the winter term.

Remarks for AM5

There is a laboratory lab class on molecular genetics offered within the semester break for students with a background knowledge in biology, molecular biology or psychobiology. The class will be held in German language. Participation in this basic lab class is required for attending the advanced lab class next summer semester.

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 the case you want to learn the FMRI –technique in the first semester, an individual application for the course is necessary: rebekka.heinen@rub.de

Students who would like to acquire basic background knowledge in the field of neuroimaging, are recommended to attend the seminar "Bildgebende Verfahren in der Neuropsychologie" (held in german language) from section D1 (lecturer: Prof. Boris Suchan).

Further advanced methods can be found in the program from the last summer semester on our webpage: http://www.ruhr-uni-bochum.de/philosophy/mcs/program_courses.html. They will again be offered in the upcoming summer semester.

*SEMINAR***MOLEKULARGENETISCHES LABORPRAKTIKUM (118 514)**

DR. DIRK MOSER

TERM:	Winter 2017/18
MEETING TIME:	Blockseminar: 06. – 17.03.2018 (Preliminary Meeting: 20.10.2017, 16 – 18, GAFO 04/425)
ROOM:	GAFO 05/609
CP:	t.b.a.

Language of the lab class is **GERMAN**.

Das Grundpraktikum „Molekulare Psychologie“ soll interessierten Studierenden die Schnittmenge zwischen Psychologie und Biologie experimentell begreifbar machen. Hierzu wird jeder PraktikumssteilnehmerIn aus eigenem Blut DNA extrahieren und diese im Verlauf der Woche auf verschiedene, in der psychobiologischen Forschung prominente Genvarianten überprüfen. Hierzu finden eine Vielzahl molekularbiologischer Methoden Anwendung. Praktikumsbegleitend werden molekulare Grundlagen sowie experimentelle Möglichkeiten, sowie die Ergebnisse der eigenen praktischen Versuche in Spezialvorträgen präsentiert und diskutiert.

Vorbesprechung ist am 20.10.2016 um 16:00 Uhr

Der einwöchige Kurs (Mo-Fr 9:00 bis 13:00) findet im Anschluss an das Wintersemester in den Semesterferien statt und ist auf 6 Teilnehmer beschränkt.

Teilnahmevoraussetzung: gute bis sehr gute Kenntnisse in Biologie/Molekularbiologie/Psychobiologie.
Praktikumssprache ist Deutsch.

PRACTICAL COURSE/EXERCISE

ANGEWANDTE NEUROPSYCHOLOGISCHE METHODEN

– MRT (118512)

REBEKKA HEINEN

TERM:	Winter 2017/18
MEETING TIME:	Monday, 14-16 (First meeting: 09.10.2017)
ROOM:	GAFO 05/609
	Max. 14 participants
CP:	t.b.a.

(see remarks for AM7 on page 23)

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

Please also see remarks for AM7 above.

The practical course will be given in English. It introduces into the practical usage of the advanced neuroscientific imaging technique MRI. It is combined with the following seminar into an educational package. It should be taken by students who aim to do a master project with MRI technique.

"Das Praktikum steht in direktem Zusammenhang mit dem gleichnamigen Seminar (ebenfalls 2 SWS). Die Teilnahme an beiden Veranstaltungen ist erforderlich. Ziel ist die Vermittlung

der Fähigkeit, auf der Basis der veröffentlichten neuropsychologischen Literatur weiterführende Forschungsfragen im Bereich der kognitiven Neurowissenschaft zu entwickeln, die entsprechenden Untersuchungen zu konzipieren, eigenständig durchzuführen und auszuwerten. Ein weiteres Ziel ist das Erlernen der Fertigkeit, die Ergebnisse einer Untersuchung entsprechend den Standards neurowissenschaftlicher Fachzeitschriften in schriftlicher Form zu präsentieren. Ein zentrales Lernziel dieser Veranstaltung - und damit auch Grundlage für die erfolgreiche Teilnahme und Leistungsbewertung - ist das Erlernen praktischer Fähigkeiten. Daher ist eine regelmäßige Anwesenheit im Umfang von mindestens zwei Dritteln der Termine notwendig."

SEMINAR
 ANGEWANDTE NEUROPSYCHOLOGISCHE METHODEN
 – MRT (118 511)
 ANNE BIERBRAUER

TERM: Winter 2017/18
 MEETING TIME: Monday, 10-12 (First meeting: 09.10.2017)
 ROOM: GAFO 05/609
 Max. 14 participants
 CP: t.b.a.

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

This seminar is held in English. It introduces into the theory of the advanced neuroscientific imaging technique MRI. It is combined with the practical course above into an educational package. It should be taken by students who aim to do a master project with MRI technique.

"Das Seminar steht in direktem Zusammenhang mit dem gleichnamigen Praktikum (ebenfalls 2 SWS). Die Teilnahme an beiden Veranstaltungen ist erforderlich. Ziel ist die Vermittlung der Fähigkeit, auf der Basis der veröffentlichten neuropsychologischen Literatur weiterführende Forschungsfragen im Bereich der kognitiven Neurowissenschaft zu entwickeln, die entsprechenden Untersuchungen zu konzipieren, eigenständig durchzuführen und auszuwerten. Ein weiteres Ziel ist das Erlernen der Fertigkeit, die Ergebnisse einer Untersuchung entsprechend den

Standards neurowissenschaftlicher Fachzeitschriften in schriftlicher Form zu präsentieren. 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."

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. Tobias Starzak or Prof. Albert Newen. Students are only allowed to take maximally 3 German courses in the whole program up to maximally 12 credit points.

D1.

Free Selection

SEMINAR
DISKURS NEUROPSYCHOLOGIE (118 611)
PROF. NIKOLAI AXMACHER

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 10.00 – 12.00 (First Meeting: 12.10.2017)
ROOM:	GAFO 05/609
CP:	3

Hier wird der intensive Austausch über ein vorgegebenes Forschungsthema in einer kleinen Gruppe ermöglicht. Ein wichtiger Aspekt ist auch die Einladung und Betreuung von Gastrednern und die Teilnahme am wissenschaftlichen Vortrag. Ein zentrales Lernziel dieser Veranstal-

tung - 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.

*LECTURE***STRESS (117 031)**

PROF. OLIVER WOLF

TERM:	Winter 2017/18
MEETING TIME:	Monday, 12-14 (First Meeting: 09.10.2017) Exam: Wednesday, 2018, April 04, 10-12 in HGA 10
ROOM:	HGA 20
CP:	t.b.a.

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 (112 231)**

PROF. ONUR GÜNTÜRKÜN

TERM:	Winter 2017/18
LECTURE:	Thursday, 16.00 – 18.00 (First Meeting: 19.10.2017) Exam: Thursday, 2017, March 15, 12-14 in HGA 10
ROOM:	HGA 10
CP:	3

Die Vorlesung soll einen Überblick über die Lerngesetze, ihre Anwendungsmöglichkeiten in therapeutischen Verfahren und die hirneurophysiologischen 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.

Begleitend zur Vorlesung "Lernen" von Prof. Dr. Güntürkün soll dieses Seminar verschiedene Fragen zur wissenschaftlichen Auseinandersetzung mit dem Thema Lernen vertiefen. Dazu werden die Studierenden wissenschaftliche Artikel und Kapitel aus Lehrbüchern in Referatsform vortragen.

Literatur:

Als Vorbereitung ist folgendes Buch zu empfehlen: *The Principles of Learning and Behaviour*, Michael Domjan, 7. Auflage, 2015

*SEMINAR***SEMINAR NEUROPSYCHOANALYSE (118 915)**

PROF. NIKOLAI AXMACHER

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 16 – 18 (First Meeting: 12.10.2017)
ROOM:	GAFO 05/609
CP:	t.b.a.

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 Konzeptionalisierungen 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. Daher ist eine regelmäßige Anwesenheit im Umfang von mindestens zwei Dritteln der Termine notwendig

SEMINAR
**BILDGEBENDE VERFAHREN IN DER NEUROPSYCHOLOGIE (118
 513)**
 PROF. BORIS SUCHAN

TERM:	Winter 2017/18
MEETING TIME:	Wednesday, 14-16 (First meeting: 11.10.2017)
ROOM:	GAFO 05/609
CP:	3

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. Daher ist eine regelmäßige Anwesenheit im Umfang von mindestens zwei Dritteln der Termine notwendig.

Eine Literaturliste ist zu Beginn des Seminars erhältlich

*LECTURE***SOZIALPSYCHOLOGIE II (112 321)**

PROF. JENS FÖRSTER

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 10.00 – 12.00 (First Meeting: 12.10.2017) Exam: Thursday, 2018, March 22, 10-12
ROOM:	HGA 10
CP:	6

Wie erfahren wir, wer wir sind? Brauchen Menschen eher Freiheit oder eher Orientierung? Was ist das Unbewusste? Wie gehen wir mit Misserfolgen um und wie erreichen wir unsere Ziele? Wie können wir uns motivieren, etwas zu tun? Wie überwinden wir Hindernisse? Neigen alle Menschen dazu, andere zu diskriminieren? Haben wir alle aggressive Anteile? Wie entsteht Aggression? Und wie entstehen Konflikte zwischen Gruppen? Wie kann man Zivilcourage fördern? Fördert Brainstorming die Kreativität oder behindert sie sie?

In der Vorlesung zur Sozialpsychologie 2 wollen wir die Inhalte der Vorlesung zur Sozialpsychologie 1 vertiefen. Zudem sollen Anwendungsaspekte diskutiert und Forschungsmethoden anhand von Experimenten dargestellt werden. Brücken zur soziologischen, philosophischen, konsumenten-psychologischen, organisationspsychologischen, emotionspsychologischen, motivationspsychologischen und wirtschaftspsychologischen Forschung werden geschlagen, Überschneidungen werden diskutiert.

D1.

Free Selection

*COLLOQUIUM***FORSCHUNGSKOLLOQUIUM SOZIALPSYCHOLOGIE (115 915)**

PROF. JENS FÖRSTER

TERM: Winter 2017/18
MEETING TIME: Thursday, 16.00 – 18.00 First Meeting: 12.10.2017)
ROOM: GAFO 03/974
CP: t.b.a.

In diesem Kolloquium sollen Pläne für wissenschaftliche Studien, Ergebnisse und Methoden diskutiert werden. Wissenschaftlerinnen und Wissenschaftler in den unterschiedlichsten Phasen ihrer Karriere berichten über neue Entwicklungen und Probleme sozialpsychologischer Forschung. Für Studierende mit gutem Vorwissen. Meist englische Originalliteratur. Wird bekanntgegeben. Evtl. Vorträge in englischer Sprache

D1.

Free Selection

*LECTURE***EINFÜHRUNG IN DIE PHILOSOPHIE DES GEISTES (030 006)**

PROF. TOBIAS SCHLICHT

TERM: Winter 2017/18
MEETING TIME: Thursday, 10-12 (First Meeting: 12.10.2017)
ROOM: HGA 30
CP: 6

Diese Vorlesungen geben eine erste Orientierung über die spannenden Themen der Philosophie des Geistes, wie z.B. die Kernbegriffe der Intentionalität und des Bewusstseins sowie die damit verbundenen Leib-Seele-Probleme. Außerdem behandelt werden Themen wie Emotionen, Willensfreiheit, Wahrnehmung und Aufmerksamkeit sowie der Begriff der Person und die Problematik des Fremdpsychischen bzw. der sozialen Kognition.

Einführende Lektüre:

A. Newen: Philosophie des Geistes. Becksche Reihe 2013.

A. Beckermann: Analytische Einführung in die Philosophie des Geistes. 3. Auflage. Berlin 2008

D1.

Free Selection

*SEMINAR***PHILOSOPHIE DES GEISTES. EINSCHLÄGIGE TEXTE (030 042)**

PROF. TOBIAS SCHLICHT

TERM: Winter 2017/18
MEETING TIME: Tuesday, 12-14 (First Meeting: 10.10.2017)
ROOM: GA 3/143
CP: 6

In diesem Seminar werden, begleitend zur Vorlesung, zur Vertiefung des Stoffes, zentrale Texte aus der Analytischen Philosophie des Geistes der letzten 50 Jahre studiert, u.a. von Smart, Searle, Millikan, Fodor, Kim u.a.

Begleitende Lektüre:

A. Newen: Philosophie des Geistes. Becksche Reihe 2013.

A. Beckermann: Analytische Einführung in die Philosophie des Geistes. 3. Auflage. Berlin 2008.

D1.

Free Selection

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

DR. TAGRID YOUSEF

TERM: Winter 2017/18
MEETING TIME: Wednesday, 8-10 (First meeting: 18.10.2017)
Exam: Wednesday, 28.03.2018, 8 – 10, HGA 20
ROOM: HGA 10
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.

*VORLESUNG***MOTIVATION UND VOLITION (112 271)**

DR. MARLIES PINNOW

TERM:	Winter 2017/18
MEETING TIME:	Monday, 16-18 (First meeting: 16.10.2017) Exam: Monday, 16-18, 2018, March 19
ROOM:	HGA 20
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.

*SEMINAR***MEIN KÖRPER UND ICH – WAS UNS BEWUSSTSEINS-
PHÄNOMENE ÜBER DIE WAHRNEHMUNG UNSERES SELBST
ERZÄHLEN (112 616)**

PROF. MARTINA MANNS

TERM:	Winter 2017/18
MEETING TIME:	Wednesday, 12-14 (First Meeting: 18.10.2017)
ROOM:	GAFO 05/609
CP:	3 CP
	Max. 30 participants

Die Kognitive Psychologie zeigt uns, dass das Bild, welches wir uns von der Welt machen, eine Interpretation unseres Gehirns ist. Dies gilt auch für die bewusste Wahrnehmung unseres Selbst. Der portugiesische Dichter Fernando Pessoa beschreibt dies so „Meine Seele ist ein verborgenes Orchester; ich weiß nicht, welche Instrumente, Geigen und Harfen, Pauken und Trommeln es in mir spielen und dröhnen lässt. Ich kenne mich nur als Symphonie“. Basierend auf Referaten, aber auch in hoffentlich kontroversen Diskussionsrunden werden wir in diesem Seminar verschiedene Bewusstseinsphänomene be-

sprechen und so bizarre Phänomene wie Phantomglieder, Out-of-Body-Experience, Anosognosie oder Cotard Syndrom kennenlernen. Wir wollen hierzu das biopsychologische Wissen beleuchten um zu verstehen, wie das Gehirn ein Bild unseres Selbst erzeugt.

Literatur wird zu Beginn des Seminars bekannt gegeben. Ein populärwissenschaftliches Buch zum Thema ist: Vilaynur S. Ramachandran, Sandra Blakeslee. Die blinde Frau, die sehen kann: Rätselhafte Phänomene unseres Bewusstseins. Taschenbuchausgabe rororo;

*LECTURE***KOGNITION 1: WAHRNEHMUNG, AUFMERKSAMKEIT,
GEDÄCHTNIS (112 211)**

PROF. OLIVER T. WOLF

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 12-14 (First Meeting: 12.10.2017) Exam: Thursday, 2018, April 5, 10-12, HGA 10
ROOM:	HGA 10
CP:	6 CP

Die Vorlesung gibt einen Überblick über wichtige Stationen der menschlichen Aufnahme und Verarbeitung von Informationen aus der Umwelt. Dabei werden zunächst visuell und auditiv wahrnehmbare Umwelteigenschaften dargestellt. Anschließend werden einige grundsätzliche Prinzipien der frühen kognitiven Verarbeitung dieser Information besprochen. Die selektive oder parallele Weiterverarbeitung dieser Information ist Gegenstand des nachfolgenden Ab-

schnitts Aufmerksamkeit, in dem Gesetzmäßigkeiten der Aufmerksamkeitslenkung bzw. der Bedingungen für die mehr oder weniger vollständige Aufnahme von Information in das Bewusstsein im Vordergrund stehen. Den Abschluss der Vorlesung bilden Theorien über kurzzeitige Formen (Sensorisches Gedächtnis und Arbeitsgedächtnis) und überdauernder Formen (Langzeitgedächtnis und dessen Subkomponenten) der Speicherung.

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.

I1.

I1. Cognitive Philosophy

COLLOQUIUM

PHILOSOPHY AND THE COGNITIVE SCIENCES – RECENT DEBATES AND LEARNING TO MAKE A PRESENTATION IN ENGLISH (030 127)

PROF. ALBERT NEWEN, PROF. MARKUS WERNING

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 16 – 18 (First Meeting: 12.10.2017)
ROOM:	GA 04/187
CP:	6

The colloquium will offer regular presentations given partly by Bochum MA and PhD students and partly by external guests. The presentations will all be in the general domain of theoretical philosophy and the cognitive sciences with a focus on language and concepts. 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 the discussion of ongoing research and to support the education of students at the Master and PhD level. Students who are accepted for a presentation in this seminar will receive a special training in preparing presentations in English.

PhD-students who are interested in presentations should write an email to both organizers (albert.newen@rub.de and markus.werning@rub.de) and come to the first meeting. The semester program will be fixed then. PhD-students can receive 2 credit points for an active participation. MA students can receive 4-6 CP for a presentation in the colloquium (to receive a mark, MA students have to write an additional essay). Topics can be freely chosen such that MA students can develop a talk in the area of their MA project.

Language: The presentations in the colloquium and the discussion will be in English. Questions can be raised in German, but will then be translated for the whole audience.

12.

12. Cognitive Psychology

*COLLOQUIUM***RESEARCH COLLOQUIUM GENETIC PSYCHOLOGY (118 913)**

PROF. ROBERT KUMSTA

TERM:	Winter 2017/18
MEETING TIME:	Monday, 16.00 – 18.00 (First Meeting: 09.10.2017)
ROOM:	GAFO 04/425
CP:	t.b.a.

This course serves to present the current research work and qualification theses (Bachelor, Master theses, PhD project) of the Genetic Psychology unit. Moreover, invited scientists will present the latest research results in the area of Genetics, Epigenetics and Development Psychobiology. An overview of the topics and speakers will be announced with posters and on the Homepage.

12.

Cognitive Psychology

*LECTURE***LEFT BRAIN - RIGHT BRAIN (118 111)**

PROF. ONUR GÜNTÜRKÜN

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 12 – 14 (First meeting: 19.10.2017) Exam: Monday, 19.03.2017, 16 – 18, HGA 10
ROOM:	GAFO 03/252
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.

COLLOQUIUM

RESEARCH COLLOQUIUM NEUROPSYCHOLOGY (118 916)

PROF. NIKOLAI AXMACHER

TERM:	Winter 2017/18
MEETING TIME:	Thursday 14-16 (First meeting: 12.10.2017)
ROOM:	GAFO 05/609
CP:	t.b.a.

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.

*SEMINAR***THE EVOLUTION OF HIGHER COGNITIVE FUNCTIONS
IN NON-HUMAN ANIMALS (112 615)
DR. FELIX STRÖCKENS**

TERM:	Winter 2017/18
MEETING TIME:	Thursday, 12 - 14 (First Meeting: 19.10.2017) Max. 24 participants
ROOM:	GAFO 03/901
CP:	3

Humans represent without a doubt the pinnacle in the evolution of higher cognitive functions. However, other non-human animals, even outside the primate order, also possess surprisingly complex forms of higher cognition. Within this seminar, selected studies on the occurrence of such complex cognitive skills will be presented by students, focusing on species like chimpanzees, parrots, crows and dolphins. Furthermore, the seminar aims to clear up with some of the myths about what animals are capable of and what is beyond their reach. In addition to behavioral data, the seminar will also deal with the question what the neuronal underpinnings of such skills are, and if there are any neuronal similarities between species expressing complex cognition. By dealing with these topics, participants of the seminar will get an overview of the cognitive abilities of non-human animals and learn that many of the cognitive skills considered unique to humans actually developed much earlier during evolution. The seminar will be held in English and students are required to give a talk on preselected literature.

*COLLOQUIUM*SCIENTIFIC COLLOQUIUM: COGNITIVE PSYCHOLOGY AND
PSYCHONEUROENDOCRINOLOGY (115 113)

PROF. OLIVER T. WOLF

TERM:	Winter 2017/18
MEETING TIME:	Tuesday, 16.00 – 18.00 (First Meeting: 10.10.2017)
ROOM:	GAFO 02/364
CP:	t.b.a.

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 present 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

*LECTURE & EXERCISE***MACHINE LEARNING: UNSUPERVISED METHODS****(310 003 & 310 013)**

PROF. LAURENZ WISKOTT

TERM:	Winter 2017/18
LECTURE:	Tuesday, 12.15 – 13.45 (First Meeting: 10.10.2017)
EXERCISE:	Tuesday, 9-12 (First Meeting: 17.10.2017)
ROOM:	NB 3/57
CP:	6

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. Criteria for a certificate for the tutorial are an active participation, in particular presentation of selected exercises, and at least 50% in the final exam.

*LECTURE & EXERCISE***ARTIFICIAL NEURAL NETWORKS (310 002 & 310 012)**

PD DR. ROLF WÜRTZ

TERM:	Winter 2017/18
LECTURE:	Friday, 12 – 14 (First Meeting: 13.10.2017)
ROOM:	HZO 100
EXERCISE:	Wednesday, 14 – 18 (1 hour groups) (First Meeting: 11.10.2017)
ROOM:	ND 03/99
CP:	5

This lecture presents standard algorithms and new developments of feedforward Artificial Neural Networks, their functioning, application domains, and connections to more conventional mathematical methods. Examples show the potential and limitations of the methods. Supervised as well as unsupervised learning methods are introduced.

In detail:

- 1) Introduction, some biological facts
- 2) Mathematical foundations: probability theory and partial derivatives
- 3) One layer networks and linear discriminants
- 4) Multilayer networks and error backpropagation
- 5) Universality of two-layer networks
- 6) Radial basis function networks

- 7) Neuronal maps: Kohonen network, Growing Neural Gas
- 8) Optimization methods

The course will be given in English upon request.

Grades and credits are given according to the percentage of solved problems in exercise 310012 and presentation of a solution during the exercise.

Literature suggestions:

C. M. Bishop, Neural Networks for Pattern Recognition, 1995 Clarendon Press, Oxford.
S. Haykin, Neural Networks and Learning Machines, 3rd edition, 2003, Pearson, New Jersey

ONE-WEEK INTERNSHIP
AUTONOMOUS ROBOTICS (310 036)
M.SC. MATHIS RICHTER

TERM:	Winter 2017/18
MEETING TIME:	2018, FEBRUARY 19 – 23 (Preliminary meeting: 2018, February 1, 10.15h, NB 3/57)
ROOM:	NB 2/77
CP:	3

The practical course gives an introduction to mobile robotics with a focus on dynamical systems approaches. In the exercises, the computing environment Matlab 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.

Interested students who do not have experience in Matlab should attend the Matlab introduction of the lab exercise Computer Vision (typically the week before this course).

Enrollment: 01.12.2017 – 12.01.2018 e-mail: mathis.richter@ini.rub.de

COLLOQUIUM

LEARNING AND MEMORY (310 026)

PROF. SEN CHENG

TERM:	Winter 2017/18
MEETING TIME:	Tuesday, 12-14 (First meeting: 17.10.2017)
ROOM:	GA 04/187
CP:	3
	Max. 15 Participants

We will discuss the latest research results in learning and memory at the systems level. Each session will consist of either a journal club based on a published article or a research talk. Journal club meetings will include a presentation of the article by one participant and a discussion by all. Research talks will be given by members of the computational neuroscience group or external invited guests. Some meetings will be held via video conferencing with participants from the USA. To accommodate the schedule of external participants, some meetings might have to be moved to a different date and time. 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 mammalian hippocampus. The topics can be selected by the students in agreement with the instructor.

Enrolment: VSPL

Assessment: presentation in class

Attendance: mandatory, min. 66%

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

Office hours: Thursdays 14-15 or by appointment

14.

14. Cognitive Neuroscience

COLLOQUIUM

BIOPSYCHOLOGY RESEARCH COLLOQUIUM (118 914)

PROF. ONUR GÜNTÜRKÜN

TERM:	Winter 2017/18
MEETING TIME:	Monday, 13.00 – 15.00 (First Meeting: 09.10.2017 – t.b.a.)
ROOM:	GAFO 05/425
CP:	3 (obligatory essay on one of the presented topics)

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-unibochum.de/>

14.

Cognitive Neuroscience

COLLOQUIUM

THEMEN DER KOGNITIVEN NEUROWISSENSCHAFT (118 711)

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

TERM:	Winter 2017/18
MEETING TIME:	Friday, 10.00 – 12.00 (First meeting: 20.10.2017)
ROOM:	GAFO 05/609
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***LEARNING AND MEMORY (310 026)**

PROF. SEN CHENG

TERM:	Winter 2017/18
MEETING TIME:	Tuesday, 12-14 (First meeting: 17.10.2017)
ROOM:	GA 04/187
CP:	3
	Max. 15 Participants

We will discuss the latest research results in learning and memory at the systems level. Each session will consist of either a journal club based on a published article or a research talk. Journal club meetings will include a presentation of the article by one participant and a discussion by all. Research talks will be given by members of the computational neuroscience group or external invited guests. Some meetings will be held via video conferencing with participants from the USA. To accommodate the schedule of external participants, some meetings might have to be moved to a different date and time. 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 mammalian hippocampus. The topics can be selected by the students in agreement with the instructor.

Enrolment: VSPL

Assessment: presentation in class

Attendance: mandatory, min. 66%

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

Office hours: Thursdays 14-15 or by appointment