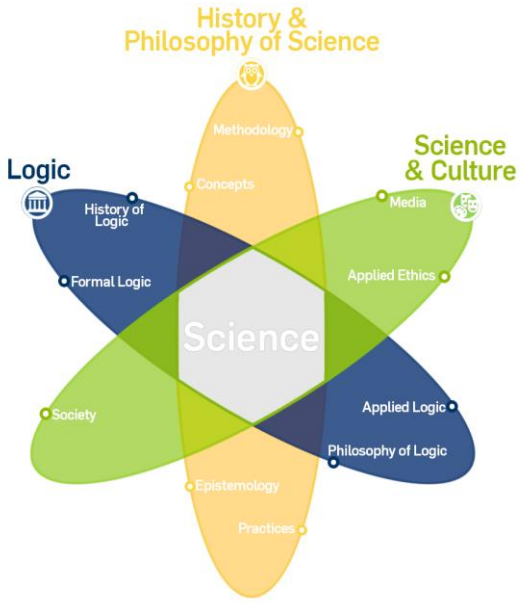
Annotated course catalogue

History, Philosophy and Culture of Science (*HPS*$^{+}$)



Summer Term 2024

Content

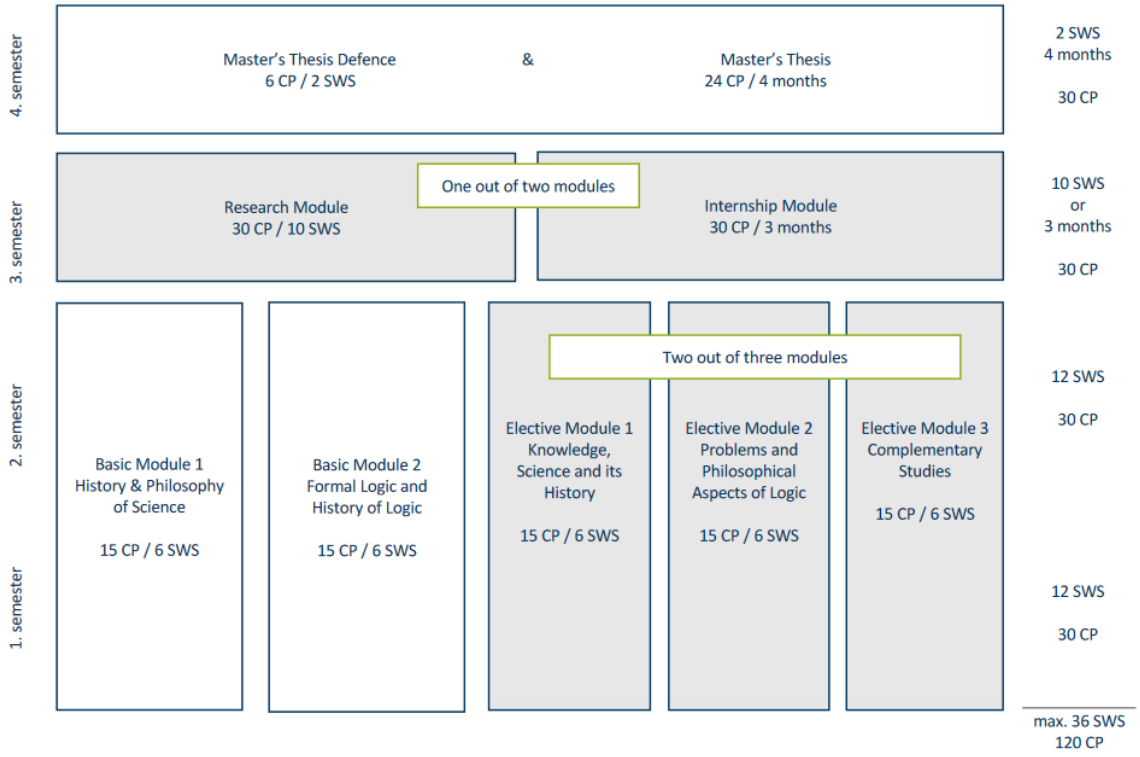
Information on registration in RUB eCampus

To register for the courses in this course catalogue, search for the course in **eCampus** using the course number (**Lehrveranstaltungsnummer**) and register.

You can access eCampus via the WebClient:

https://www.ruhr-uni-bochum.de/ecampus/ecampus-webclient/login_studierende.html

Curriculum



This study plan gives you an initial overview. You will find a detailed description of the individual modules in the module handbook. Therefore, only a **brief description** is given here:

In the first two semesters, you will study the basic modules 1 and 2 as well as two of the three compulsory elective modules. Basic module 1 (History & Philosophy of Science) is always offered in the summer semester and basic module 2 (Formal Logic and History of Logic) in the winter semester. Depending on when you start your studies, you will therefore complete basic module 1 or 2 first. The courses from the three compulsory elective modules are offered every semester.

In the third semester, you will study **either** the internship module **or** the research module. The internship module gives you the opportunity to complete a three-

month internship, about which you will write an internship report. In the research module, on the other hand, you work on your own research-related question in one of the three subject areas of the compulsory elective modules, which also serves as preparation for the Master's thesis. You can complete the research module at the Ruhr University or in the form of a semester abroad, preferably at one of the universities with which we have cooperation agreements. The same naturally applies to the practical module: The internship can be completed in Bochum, elsewhere in Germany or abroad. In both modules, the focus is on your own commitment, but we will also support you in the realisation (finding internships, formulating questions, finding topics, etc.). If you already know that after your Master's degree you would like to pursue a career outside of academia in the narrow sense, but with a scientific connection (e.g., science foundations, museums, education and science ministries, science journalism, university administrations, to name just a few example), then the internship module is ideal for this. If, on the other hand, you are 'drawn' to science itself and you already know, for example, that you would like to Thu a doctorate, then the research module offers you the ideal conditions to start honing your 'scientific profile' during your studies.

Finally, in the fourth semester, you will write your Master's thesis in the final module and present it in a specially designed colloquium.

— Overview —

Basic module 1: *History and Philsophy of Science*

030003	History and Philosophy of Science, II			
	Lecture	Thu 14-16	GABF 04/511	Baedke
030094	History and Philosophy of Science, I			
	Seminar	Thu 10-12	IC 04/414	Baedke
030097	Methods in History and Philosophy of Science (PHI)			
	Blockseminar	*09.-13.09.24*, 10-16	GABF 04/352	Baedke

Basic module 2: *Formal Logic and History of Logic*

— **Will be offered again in the winter semester 2024/2025** —

Elective Module 1: *Knowledge, Science and its History*

030110	Philosophical Methods: An Introduction (PHI)			
	Seminar	Thu 10-12	GAFO 04/619	Horvath
030113	Introduction to Social Epistemology			
	Seminar	Mo 14-16	GA 3/143	Straßer, Wang
030114	Introduction to Formal Epistemology			
	Seminar	Wed 16-18	GD 1/236	Straßer, Wang
030103	Epistemology of Inquiry			
	Seminar	Thu 14-16	Wasserstr. 221/4	Seselja
030127	Lecture Series 'History and Philosophy of the Life Sciences' (PHI)			
	Kolloquium	Mo 16-18	online	Baedke
030007	Social Epistemology of Science (PHI)			
	Lecture	Thu 16-18	Wasserstr. 221/4	Seselja
030115	Integrated History and Philosophy of Science (PHI)			
	Blockseminar	*18.05., 08.06., 13.07.* 10-16	Wasserstr. 221/4	Seselja
030116	Social Epistemology of Bad Beliefs: Filter Bubbles, Informational Cascades, and Identity Beliefs (PHI)			
	Seminar	Tue 14-16	GABF 04/609	Michelini, Seselja

030092	Philosophische Grundlagen und Grundfragen zur Statistik und Wahrscheinlichkeit (PHI)			
	Seminar	Thu 10-12	GABF 04/358	Pulte

Elective Module 2: *Problems and Philosophical Aspects of Logic*

030086	Gentzen: The Provability of the Consistency of Arithmetic (PHI)			
	Seminar	Wed 14-16	GABF 04/358	Kürbis, Skurt
030088	Gentzen: The Provability of Consistency of Arithmetic (PHI)			
	Exercise	Thu 14-16	GABF 04/358	Kürbis, Skurt
030105	Formal Argumentation and Defeasible Reasoning			
	Seminar	Wed 14:30-16:00	Wasserstr. 221 1	Straßer
030107	Exercises: Formal Argumentation and Defeasible Reasoning			
	Seminar	Wed 16:15-17:45	Wasserstr. 221 1	Straßer
030100	Research seminar on contradictory logics (PHI)			
	Seminar	Tue 14-16	GABF 04/358	Wansing
030120	Topics in Philosophy of Language, Logic, and Information: Attitudes and their objects (PHI)			
	Seminar	Wed 16-18	GA 04/187	Liefke, Rami
030121	Research Colloquium “Logic and Epistemology” (PHI)			
	Kolloquium	Thu 16-18	GABF 04/358	Kürbis, Skurt
030093	Ontologische Gottesbeweise			
	Seminar	Tue 14-16	GABF 04/711	Kürbis
211117	Perlen der Logik (INF)			
	Seminar	Thu 14-16	MC 1/54	Zeume

Elective Module 3: Complementary Studies

211057	Highlights of Theoretical Computer Science (INF)			
	Lecture and Exercise	Tue 10-12 Tue 14-16	MC 1/54	Walter, Zeume, Lysikov

		Thu 10-12		

080360	S Data Society: Cultural and Gender perspectives across Germany, China and Taiwan (Global Classroom format) (SOW)			
	Blockseminar	*04.04,* 10-16 *11.04., 18.04., 25.04., 02.05., 16.05.* 08:30-11:45	GD 1/236a MB 0/172	Sørensen, Abels
051711	Situated Knowledge and Autotheory (MEW)			
	Seminar	Mo 10-12	GB 1/144	Gunkel
030111	Philosophy of Artificial Intelligence: Concepts, Computation, & Connectionism (PHI)			
	Seminar	Wed 14-16	GA 04/187	Werning
030054	Introductory Math and Programming for Computational Philosophy (PHI)			
	Seminar	Tue 10-12	GABF 04/609	Yoo
030104	The Ethics of Algorithmic Outsourcing (PHI)			
	Seminar	Wed 16-18	GABF 04/511	Titz
030134	Economic Ethics			
	Seminar	Mo 14-16	GA 03/142	Steigleder
030129	Colloquium Digitale			
	Colloquium	Tue 16-18	GA 3/143	Weber-Guskar. Weydner-Volkmann
030119	Colloquium Philosophy of Information and Communication			
	Colloquium	Tue 12-14	GABF 04/358	Liefke
030132	Philosophy Meets Cognitive Science: Memory and Language			
	Colloquium	Tue 12-14	GA 04/187	Werning
030126	EXTRA Research Colloquium "Metaphilosophy, Experimental Philosophy, and Argumentation Theory"			
	Colloquium	Wed 16:30-18:00	GAFO 04/619	Horvath

030109	Einführung in die Philosophie der Künstlichen Intelligenz			
	Seminar	Wed 14-16	GABF 05/707	Horvath

Requirement "Studying the basics of history of science worth 6 CP"

In order to fulfill the requirement, you must definitely attend **the lecture and one of the accompanying seminars**. At the beginning, point out to the docent that you are attending the course as a requirement for HPS+; If you need further advice, please contact us.

Both courses attended can be credited towards compulsory elective area 2 (History and Society).

You usually receive 7 CP for the lecture + seminar. To get 10 CP in WPM 2, you can either attend another course with 3 CP from WMP 1, or you can ask the docents of the two courses about the possibility of getting more CP.

030014	David Hume – Traktat über die Menschliche Natur (HE)			
	Seminar	Mo 14-16	GABF 04/716	Woodley
030016	Descartes: Abhandlung über die Methode (HE)			
	Seminar	Mo 12-14	GA 03/46	Gante
030001	Vernunft und Rationalität in der Moderne (HE)			
	Lecture	Wed 14-16	HGB 10	Sandkaulen

Requirement "Studying the basics of philosophy of science worth 6 CP"

Courses for this requirement will only be offered again in the winter semester 2022/2023.

Abbreviations
ERW = educational science
GER = German Studies / General and Comparative Literature
GEW = historical science
JUR = law
MED = medicine
MEW = media studies
PHI = Philosophy
SOW = Social Science

Important information for historical science events (GEW):

Some of the history courses can only be credited as a 'package', whereby a package consists of a lecture, a seminar and an exercise. If in doubt, please ask the respective lecturer how you can get credit for a specific course.

— Annotation[1] —

[1] At the time this course catalog was created, comments were not available for all courses. You can access the course catalogue at https://vvz.ruhr-uni-bochum.de/ and then search for the relevant course using the course number (make sure you have the correct semester at the top left!) and then use the "Veranstaltungdetails" ("Course details") tab to see if there is a comment now.

Basic module 1: History and Philosophy of Science

030003	History and Philosophy of Science, II			
	Lecture	Thu 14-16	GABF 04/511	Baedke

This course belongs to the lecture “History and Philosophy of Science, I”; further information on the subjects are given there. It extends and deepens special topics of Part I by discussing philosophical and historical sources. Therefore, attending makes only sense when you also visit Part I. The course is obligatory for students of the master program HPS+Logic, but can also be taken by interested advanced B.A. and M.A. students from philosophy, the natural sciences and other subjects. The language will be English (unless all participants are German-speaking). Literature and modalities concerning credits will be discussed in the first session.

Introductory Literature:
Martin Curd, M. & James A. Cover (Eds.), Philosophy of Science. The Central Issues. 2nd ed., New York, London 2013.
Simon Lohse & Thomas Reydon (Hgg.): Grundriss Wissenschaftsphilosophie. Die Philosophien der Einzelwissenschaften. Hamburg 2017.
Alexander Rosenberg, Philosophy of Science. A Contemporary Introduction. 2nd ed., New York 2005.

030094	History and Philosophy of Science, I			
	Seminar	Thu 10-12	IC 04/414	Baedke

History and philosophy of science reflects on the historical and theoretical foundations, methods and aims of science. This includes further subjects like patterns of the historical development and the social structure of science. By tracing major scientific developments from the early modern period to the late 20th century, focusing especially on the exact and life sciences, this two-part module (see below) gives an overview over the present status of history and philosophy of science. It deals with problems of methods and scientific practices (like experimentation), certain key concepts (such as “explanation” and “understanding”), and it examines questions that focus on the significance of the historicity of scientific knowledge and the role of values in science or freedom of science.
The course is an open-format lecture (with seminar-like discussion elements) designed for the MA-program “History & Philosophy of Science and Logic” (HPS+Logic). It is also open to other interested advanced B.A. and M.A. students of philosophy and students from the natural sciences and other subjects (with basic knowledge in theoretical philosophy). The lecture is accompanied by the course “History and Philosophy of Science, II” that serves to deepen and to complement the topics of the lecture. Participation in both parts of the module is highly recommended. For students of HPS+Logic it is a requirement in order to complete the “Basic Module 1”. The language of the lecture will be English. You will be informed about modalities concerning credits in the first session.

030097 Methods in History and Philosophy of Science (PHI)
Blockseminar *09.-13.09.24*, 10-16 GABF 04/352 Baedke

This seminar addresses methodological issues in philosophy of science. This includes, among others, ways to conduct philosophy *of* science vs. philosophy *for* science, methods of integrated history and philosophy of science (HPS), argumentation theory as well as experimental and digital methods in philosophy of science. The seminar is obligatory for students of the master program HPS+.

Elective Module 1: Knowledge, Science and its History

030110 Philosophical Methods: An Introduction (PHI)

Seminar Thu 10-12 GAFO 04/619 Horvath

In this introductory seminar, we will discuss both general questions about methods, such as "What are methods in the first place?" and "How should methods be evaluated?", and specific questions about philosophical methods, like "Are there any philosophical methods at all?", "Are there uniquely or distinctively philosophical methods?", "What are the main philosophical methods?". In this context, we will also consider some philosophical methods in more detail, for example, argumentation, conceptual analysis, experimental philosophy, formal methods, and thought experiments. The course will be based on a manuscript version of the introductory volume *Methods in Analytic Philosophy: A Primer and Guide* (edited by Joachim Horvath, Steffen Koch, and Michael G. Titelbaum), which is forthcoming as an open access book with the PhilPapers Foundation. There will be some flexibility for the participants of the seminar to decide which philosophical methods they want to focus on, and for these selected methods we will also discuss a few further readings. Apart from the ability to read philosophical texts in English, some prior experience with actually doing philosophy would be very helpful for a seminar that aims to reflect on methods as a key aspect of philosophical practice.

030113 Introduction to Social Epistemology

Seminar Mo 14-16 GA 3/143 Straßer, Wang

This course introduces selected topics in social epistemology, which addresses epistemological problems on a societal level. The primary focus will be on mathematical models of belief aggregation problems, which can vary depending on the input or output data type, logical relations of issues, incorporation of (shared) evidence or peer respect, and considerations of dynamic factors or long-term effects. Specifically, this course will cover topics such as judgment aggregation, probabilistic opinion pooling, Condorcet's jury theorem, the wisdom of crowds, Aumann's agreeing to disagree, consensus formation, and Bayesian merging of opinions. A prerequisite for this course is first-order logic. Some familiarity with basic set theory and probability calculus would be beneficial. The course will be conducted in English. As there is no standard textbook for mathematical social epistemology except for judgement aggregation, the course will follow my lecture notes referencing important papers in social epistemology.

030114 Introduction to Formal Epistemology

Seminar Wed 16-18 GD 1/236 Straßer, Wang

Formal epistemology aims to address both old and new epistemological problems using mathematical methods. This introductory-level course will cover selected topics in formal epistemology. The main focus will be on different types of formal representation models of qualitative and quantitative beliefs and their rational relations. Specifically, the course will explore basic epistemic and doxastic logic, AGM belief revision theory, the Dutch book argument, epistemic decision theory, and the Lottery paradox. Moreover, this course aims to balance breadth and depth of understanding. Students will learn how to read formal theorems and proofs and play with mathematical concepts. A familiarity with first-order logic is a prerequisite. Some knowledge of basic set theory and probability calculus would be beneficial, though these will be taught during class. The course will be conducted in English. In principle, there will be no required readings. I will give lectures on important concepts and theorems with my lecture notes referencing the following literature.

References

Pettigrew, R. et al. (Eds.), Open Handbook for Formal Epistemology, Online.
Arlo-Costa, H. et al. (Eds.), Readings in Formal Epistemology Source Book, 2016, Springer.
Gärdernfors, P., Knowledge in Flux, 1988, MIT.
v. Ditmanrsch, H. et al., Dynamic Epistemic Logic, 2008, Springer.
Bradley, D., Critical Introduction to Formal Epistemology, 2011, Bloomsbury.
Titelbaum, M., Fundamentals of Bayesian Epistemology I, II, 2022, OUP.
Halpern, J., Reasoning about Uncertainty, 2017, MIT.
Pettigrew, R., Accuracy and the Law of Credence, 2016, OUP.
Leitgeb, H., Stability Theory of Belief, 2017, OUP.
Douven, I. (Eds.), Lotteries, Knowledge, and Rational Belief, 2021, CUP.

030103 Epistemology of Inquiry

Seminar Thu 14-16 Wasserstr. 221/4 Seselja

How should we inquire to achieve epistemic goals? This question is situated at the intersection of the epistemology of inquiry, social epistemology and philosophy of science. On the one hand, the recent "zetetic" turn in epistemology kick-started a series of papers examining the relationship between epistemic norms, which guide rational belief formation, and zetetic norms, which guide rational inquiry. On the other hand, norms of inquiry have long been discussed in philosophy of science within the theme of pursuit-worthiness of scientific theories (what makes theories worthy of pursuit?), and in social epistemology within the theme of social organization of science and the division of cognitive labor.
In this seminar we will discuss central papers from each of these domains, aiming to identify links between them, issues under dispute and open research questions. The seminar aims to connect traditional discussions in philosophy of science and social epistemology with the frontier of research in zetetic epistemology.
The reading list will be provided at the start of the semester.

030127 Lecture Series 'History and Philosophy of the Life Sciences' (PHI)

Colloquium Mo 16-18 online Baedke

In this lecture series current topics in the history and philosophy of the life sciences will be discussed. The lecture series will host talks by international leading experts and local researchers, including philosophers and historians, but also scholars from the social and natural sciences. Participants will also have the opportunity to present their master and doctoral theses. Once per month (3-4 times during the whole term) the participants meet for a reading group meeting (instead of a lecture series talk) in which current research literature is discussed. For students (especially, but not only students of the HPS+Logic program) who want to participate and receive course credits, please write to jan.baedke@rub.de and register via eCampus. Talks will be given in English and online (via Zoom). They will be announced on: https://rotorub.wordpress.com/roto-lecture-series/

030007 Social Epistemology of Science (PHI)

Lecture Thu 16-18 Wasserstr. 221/4 Seselja

This course provides a systematic introduction to social epistemology of science, which studies the interplay between social dynamics (within science and at the interface of science and society) and scientific inquiry. Through interactive lectures, you will learn about the central problems in this field and explore philosophical discussions situated at the intersection of philosophy of science and social epistemology. The themes covered in the course range from the relationship between science

and society and the role of values in scientific inquiry to the social organization of science, responsibilities of scientists and issues pertaining to expert disagreements. In preparation for each class, your task is to read (parts of) scholarly papers and to complete a short assignment (which will be provided via Moodle).

030115	Integrated History and Philosophy of Science (PHI)			
	Blockseminar	*18.05., 08.06., 13.07.* 10-16	Wasserstr. 221/4	Seselja

The method of historical case studies is one of the central methodological approaches employed by philosophers of science. As Imre Lakatos famously put it "Philosophy of science without history of science is empty; history of science without philosophy of science is blind". But how and why do we conduct historical case studies? Which philosophical questions can benefit from such inquiry, and which conceptual tools can help us to formulate fruitful answers? In this course you will learn the basics of Integrated History and Philosophy of Science (HPS). In particular, you will learn how to conduct historical case studies to tackle philosophical questions. The seminar will consist of three main blocks, as well as online coaching sessions in between them:

1. First block (May 18) will be dedicated to the employment of the HPS approach to the study of values in the context of scientific inquiry.
2. Second block (June 8) will be dedicated to the employment of the HPS approach to the study of scientific pluralism.

After the second block, you will choose a historical case-study, which you will investigate for the remainder of the course.

1. Third block (July 13) will be dedicated to student presentations in which each student will present the results of their work.

Before each block, you will have to complete an assignment, which will consist of writing short reviews of the assigned readings (Blocks 1 & 2) or slides for your presentation (Block 3). Moreover, at each block you will have to complete an additional assignment during the class: a team-work presentation of one of the readings (Blocks 1 & 2) or the presentation of your research (Block 3).

030116	Social Epistemology of Bad Beliefs: Filter Bubbles, Informational Cascades, and Identity Beliefs (PHI)			
	Seminar	Tue 14-16	GABF 04/609	Michelini, Seselja

Why do individuals harbor false beliefs? Frequently, people lack the necessary evidence to form accurate ones. However, in specific instances, individuals possess ample evidence and yet persist in adopting bad beliefs—false beliefs held in contradiction to the available evidence. Think of climate change deniers. Empirical evidence indicates that most climate change deniers are aware that scientific results contrast their beliefs, but they hold them nonetheless. Why is that so? What brings people to form bad beliefs?

This course embarks on the quest to unravel this very question, drawing from the rapidly expanding philosophical literature on the subject. We'll begin by exploring what it means to respond appropriately to evidence. Subsequently, we'll review the most important philosophical accounts of bad beliefs.
These accounts take for granted that the cause of bad beliefs is not to be found in the cognitive deficiencies of the individuals, but rather in their socio-epistemic environment. Think again of climate change deniers. May it be that they hold such false beliefs because they trust the wrong experts? Or maybe because by doing so, they will get some benefits from others in the group? Or could they be stuck in a filter bubble, in which scientists are regarded as charlatans?
While the primary focus of our literature exploration will be social epistemology, we'll also draw insights from social science and social psychology. Moreover, a brief section of the course will be dedicated to examining computational models that simulate the formation of bad beliefs.

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

References

Cassam, Quassim (2019). Conspiracy theories. John Wiley & Sons.
Funkhouser, Eric (2017). “Beliefs as signals: A new function for belief”. In:Philosophical Psychology 30.6, pp. 809–831.
— (2022). “Dangerous beliefs, effective signals”. In: Philosophical Psychology, pp. 1–21.
Levy, Neil (Jan. 2019). “Due deference to denialism: explaining ordinary people’s rejection of established scientific findings”. In: Synthese 196.
— (2021). “Bad beliefs: Why they happen to good people”. Oxford University Press.
— (2023). “Echoes of covid misinformation”. In: Philosophical Psychology 36.5, pp. 931–948.
Nguyen, C Thi (2020). “Echo chambers and epistemic bubbles”. In: Episteme 17.2, pp. 141–161.
Williams, Daniel (2021). “Socially adaptive belief”. In: Mind & Language 36.3, pp. 333–354.
— (2023a). “Bad Beliefs: Why They Happen to Highly Intelligent, Vigilant, Devious, Self-Deceiving, Coalitional Apes”. In: Philosophical Psychology 36.4, pp. 819–833.
— (2023b). “The marketplace of rationalizations”. In: Economics & Philosophy 39.1, pp. 99–123.

030092 Philosophische Grundlagen und Grundfragen zur Statistik und Wahrscheinlichkeit (PHI)

Seminar Thu 10-12 GABF 04/358 Pulte

In den modernen Wissenschaften nehmen Methoden und Techniken der Statistik einen immer größeren Raum ein, wobei nicht nur die klassische Statistik zum Einsatz kommt, sondern auch neuere Entwicklungen, insbesondere Bayesianische Ansätze. Wichtige neuere Verfahren in den Wissenschaften wie Maschinenlernen oder Modellauswahl sind ohne Statistik gar nicht denkbar. Dabei steht deren immer breitere Anwendung und Wirksamkeit in einem krassen Missverhältnis zu einem Verständnis ihrer Grundlagen, insbesondere dem des Wahrscheinlichkeitsbegriffes und seiner philosophischen Voraussetzungen.

Das Seminar setzt hier an und will die erforderlichen systematischen Grundlagen zu einem angemessenen und philosophisch reflektierten Gebrauch von statistischen Methoden legen sowie offene philosophische Fragen analysieren. Es richtet sich primär an fortgeschrittene Studierende der Philosophie und der Mathematik mit Grundkenntnissen der Theoretischen Philosophie, insbes. der Wissenschafts- und Erkenntnistheorie. Eine Kreditierung des Seminars ist in beiden Fächern möglich. Über Bedingungen des Scheinerwerbs, die inhaltliche Struktur, den Aufbau des Seminars und Literatur wird in der ersten Sitzung informiert, die daher bei Teilnahmeinteresse unbedingt wahrgenommen werden sollte.

Für Mathematikstudierende (B.Sc./M.Sc.) kann das Modul im Nebenfach Philosophie oder als freier Wahlbereich (B.Sc.) angerechnet werden. Mathematikstudierende (M.Ed.) können das Seminar als Schlüsselkompetenz im Modul 1 anrechnen. Das Belegen des Moduls als zusätzliche Leistung ist in allen Mathematikstudiengängen möglich.

Textgrundlage (Anschaffung zwingend erforderlich):

Otsuka, Jun: Thinking About Statistics. The Philosophical Foundations. New York/London 2023. (Routledge)

Elective Module 2: Problems and Philosophical Aspects of Logic

030086 Gentzen: The Provability of the Consistency of Arithmetic (PHI)

Seminar | Wed 14-16 | GABF 04/358 | Kürbis, Skurt

In 1936 Gentzen published the first consistency proof of Peano Arithmetic. To be precise, Gentzen proved the consistency of Peano arithmetic formalised in a version of his sequent calculus. Gödel's second incompleteness theorem shows that the consistency of Peano Arithmetic cannot be proved within Peano arithmetic, if it is consistent. Consequently, Gentzen's proof must make use of methods that do not form part of Peano arithmetic. Gentzen used transfinite induction over the complexity of proofs up to the ordinal ??0. This raises the philosophical question whether the method of proof can be regarded as finitary, as demanded by Hilbert's Programme. Besides the proof, Gentzen's article also contains philosophical considerations concerning this question. We'll go through the entirety of Gentzen's article. Time permitting, we also look at Hilbert and Bernays' assessment of Gentzen's proof in relation to Hilbert's Programme.

Gerhard Gentzen: Die Widerspruchsfreiheit der reinen Zahlentheorie, Mathematische Annalen 112 (1936): 493-565. English Translation in Szabo: The Collected Papers of Gerhard Gentzen, (Amsterdam 1969)
Anna Horská: Where is the Gödelpoint hiding: Gentzen's Consistency Proof of 1936 and his Representation of Constructive Ordinals (Cham etc 2014)

030088 Gentzen: The Provability of Consistency of Arithmetic (PHI)

Exercise | Thu 14-16 | GABF 04/358 | Kürbis, Skurt

This class is intended to accompany the seminar with the same title. We'll focus on exercises to related to the material introduced in the seminar, such as proofs in sequent calculus, comparisons between natural deduction and sequent calculus and the calculus Gentzen's uses for his consistency proof.

Gerhard Gentzen: Die Widerspruchsfreiheit der reinen Zahlentheorie, Mathematische Annalen 112 (1936): 493-565. English Translation in Szabo: The Collected Papers of Gerhard Gentzen, (Amsterdam 1969)
Anna Horská: Where is the Gödelpoint hiding: Gentzen's Consistency Proof of 1936 and his Representation of Constructive Ordinals (Cham etc 2014)

030105 Formal Argumentation and Defeasible Reasoning

Seminar | Wed 14:30-16:00 | Wasserstr. 221 1 | Straßer

This course introduces into formal argumentation theory. Formal argumentation provides formal models of defeasible reasoning and argumentative exchanges.
We reason defeasibly whenever our conclusions don't necessarily follow from our assumptions, but rather typically, or probably, or plausibly. In unexpected circumstances we may have to retract these kind of inferences. For instance, although we had assumed that it rained during the night on the bases of observing wet streets, only to later learn that the streets have been cleaned. Typically we reason in this way when we lack information or the given information is uncertain. As such, this type of reasoning is central in everyday as well as in expert reasoning. Argumentation provides a natural way to think about defeasible reasoning since in cases in which we have to retract inferences can be expressed in terms of counter-arguments.
In this course we will cover basic approaches in formal argumentation, starting from Dung's

seminal theory of abstract argumentation to systems of logic-based argumentation. In this way students get introduced into an important and highly unifying sub-family of non-monotonic logics (i.e., logics for defeasible reasoning) and, more generally, into a central paradigm in contemporary symbolic artificial intelligence.
A basic knowledge in formal logic is presupposed (such as a basic introductory lecture). Other than that, any student in the 5th+ term of a Bachelor program resp. in a master program can follow the course.

The course has a exercise unit in which weekly exercises are discussed.

030107	Exercises: Formal Argumentation and Defeasible Reasoning			
	Seminar	Wed 16:15-17:45	Wasserstr. 221 1	Straßer

This is the exercise unit for the course "Formal Argumentation and Defeasible Reasoning".

030100	Research seminar on contradictory logics (PHI)			
	Seminar	Tue 14-16	GABF 04/358	Wansing

This seminar is related to the ERC-Advanced Grant project ConLog, Contradictory Logics: A Radical Challenge to Logical Orthodoxy, and contributes to the idea of research-based learning. The seminar is open to M.A. students with an interest in philosophical logic, the philosophy of logic, and the philosophies of language and of science. Students are invited to suggest papers and topics related to negation inconsistent logics.

In the 20th century, many systems of non-classical logic have been developed, including inconsistency-tolerant logics, which are typically all subsystems of classical logic. There are, however, logical systems that are radically different from classical logic insofar as they are non-trivial but contradictory. These logics are in glaring conflict with logical orthodoxy since Aristotle, who called the Principle of Non-Contradiction the firmest of all principles. Non-trivial contradictory logics not only permit inconsistencies in theories, but contain provable contradictions.
A prerequisite for a successful attendance in the seminar is some knowledge of non-classical logic and modal logic, including familiarity with Gentzen-style proof systems and Kripke models. We will discuss ongoing research into non-trivial contradictory logics and their applications in the philosophy of logic, and will read research papers, old and new, dealing with the notions of contradictoriness, consistency, negation, triviality, and related concepts. These papers may range from rather informal to formal studies. Students can earn credits by presenting a paper and will get detailed feedback. The seminar will continue to run over several semesters.

Students interested in experimental work on the endorsement or rejection of certain logical principles that play a crucial role in obtaining non-trivial negation-inconsistent logics are also very welcome.

030120 Topics in Philosophy of Language, Logic, and Information: Attitudes and their objects (PHI)

Seminar	Wed 16-18	GA 04/187	Liefke, Rami

Assume that Gregor imagines turning into a beetle. Intuitively, this is different both from Gregor imagining a beetle and from Gregor imagining (turning into) a vermin (even if all beetles are vermin). This seminar introduces current philosophical research on mental states like imagination and their metaphysical objects (e.g. possibilities, fictional entities). To facilitate access to this area, the seminar will combine topical introductions (by Kristina Liefke and Dolf Rami) with presentations by well-known researchers (e.g. Alex Grzankowski, Justin D'Ambrosio, Friederike Moltmann). Students will have the opportunity to earn a 'kleine Studienleistung' [3 CPs] (by writing a summary of one of the expert presentations, or by giving an in-class talk) and a 'große Studienleistung' [6 CPs] (by additionally writing a research paper).

030121 Research Colloquium "Logic and Epistemology" (PHI)

Kolloquium	Thu 16-18	GABF 04/358	Kürbis, Skurt

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

030093 Ontologische Gottesbeweise

Seminar	Tue 14-16	GABF 04/711	Kürbis

Im Jahr 1078 gab Anselm von Canterbury in seinem Proslogion (Abschnitte II und III) einen trügerisch einfach erscheinenden Beweis für die Existenz Gottes. Sei Gott dasjenige, so dass nichts größeres gedacht werden kann; etwas was in Wirklichkeit existiert, ist größer, als etwas, was nur im Denken existiert; wenn Gott nur im Denken, aber nicht in Wirklichkeit existieren würde, gäbe es etwas, was größer wäre als Gott:, was ein Widerspruch ist: also existiert Gott in Wirklichkeit. Der Beweis blieb nicht lange unangefochten. Schon ein Jahr später schrieb Gaunilo, ein Mönch aus Marmoutier, an Anselm einen Brief, in dem er in ähnlicher Weise beweist, dass die perfekte Insel existieren muss. Anselm antwortete und verfügte, dass von nun an seine Schrift immer mit Gaunilos Gegenargument und seiner Antwort vervielfältigt werden sollte. Anselms Beweis scheint zu viel zu beweisen, aber was genau ging schief oder wo unterscheidet sich Anselms Beweis von Gaunilos? Anselms Beweis hat Philosophen und Logiker von Aquinas über Descartes und Leibniz bis Gödel beschäftigt. Im Seminar werden Anselms Beweis, Gaunilos Einwand, und verschiedene Interpretationen und Weiterentwicklungen vom Mittelalter bis zur Gegenwart besprochen.
J. Bromand und G. Kreis: Gottesbeweise. Von Anselm bis Gödel (Suhrkamp 2011)
G. Oppy (ed.): Ontological Arguments (Cambridge University Press 2018)

211117 Perlen der Logik (INF)

Seminar	Thu 14-16	MC 1/54	Zeume

Content:

Logics play an important role in many modern computer science applications. Relevant information is extracted from databases with the help of logic-based query languages; the formal verification of software and hardware is based on logical specification languages and algorithms for these; and methods for automated reasoning in artificial intelligence have their basis in formal logic.

Motivated by these applications, we will explore advanced topics in logic in this seminar. Among others, topics will include:

• Satisfiability. The satisfiability problem for logical formulae is one of the funda-mental algorithmic problems. Understanding for which logics it can be solved and with which algorithmic complexity is therefore a major research area in computational logic.
• Expressivity. Logics are the basis for specification languages in formal verifica-tion and for query languages for databases. Understanding the expressive power of logics therefore yields valuable insights into the usefulness of specifi-cation and query languages.
• Tailor-made logics. There is a plethora of logical formalisms designed for applications which are tailor-made to have nice algorithmic properties while preserving the requi-rements on expressivity required by the application. We will explore several such for-malisms.

The seminar is on the theoretical side of computer science, so students are expected to be interested in and to enjoy theoretical topics.

Learning outcome:

Students will be able to independently explore advanced topics in logic in computer science. They will be able to present the topic orally and in writing, and to critically analyse the topic independently.

Allocation of places:

Places are allocated centrally by the faculty until 29.02.24: https://moodle.ruhr-uni-bochum.de/course/view.php?id=56714.

You must also register for the associated examination in Flexnow within the deadline. Information on the deadlines can be found on the website of the Examinations Office of the Faculty of Computer Science.

Elective Module 3: Complementary Studies

211057	Highlights of Theoretical Computer Science (INF)			
	Lecture and	Tue 10-12	MC 1/54	Walter,
	Exercise	Tue 14-16		Zeume,
		Thu 10-12		Lysikov

The insights and techniques of modern theoretical computer science have been key for advances in all areas of computer science. In this course, we will discuss some highlights and the techniques that underpin them.

Possible topics that we might cover:

- Computational models (is there life beyond Turing machines?)
- Kolmogorov complexity (what is the shortest program that produces some output?)
- Communication complexity (how many bits must Alice and Bob exchange to jointly solve a problem?)
- Fine-grained complexity (are some easy problems easier than others? and why?)
- Fast multiplication of numbers and matrices (can you beat the high-school method?)
- Randomness (does it really help to compute faster?)
- Circuit lower bounds (why is it so hard to prove that problems are hard?)
- Convex optimization (how to maximize profit if all you can ask are yes/no questions)
- Hardness of approximation (how easy is it to find near-optimal solutions?)
- Cryptography and computation

If you enjoyed your first course in theoretical computer science in the Bachelor's and would like to deepen your knowledge by getting an overview of the fascinating theory of computing, then this course will be exactly right for you.

Current information such as lecture dates, rooms or current lecturers and trainers can be found in the Ruhr University course catalog https://vvz.rub.de and in eCampus https://www.rub.de/ecampus/ecampus-webclient

More information about the course can be found on https://qi.rub.de/highlights_ss24 and on Moodle.

There is no single textbook for the course. Some good starting points are:

- Arora, Barak. Computational Complexity: A Modern Approach. Cambridge University Press. A preprint is available at: http://theory.cs.princeton.edu/complexity/book.pdf
- Kozen. Theory of Computation. Springer. 2006.

We will give further pointers to the literature where needed.

080360	S Data Society: Cultural and Gender perspectives across Germany, China and Taiwan (Global Classroom format) (SOW)			
	Blockseminar	*04.04,* 10-16 *11.04., 18.04., 25.04., 02.05., 16.05.* 08:30-11:45	GD 1/236a MB 0/172	Sørensen, Abels

It is said that digitalisation will connect all people of the world. However, digitalisation is not only a technical solution, but also a cultural, practical and political challenge. Already in the preparation of this seminar with colleagues in China and Taiwan, we experienced the difficulties of finding a common messenger to communicate. In China, many applications are regulated, and in Germany, we may have reservations about Chinese applications. Cultural and political differences manifest themselves in our smartphones and shape differences in everyday life.

In this seminar, we will use a feminist science and technology studies perspective to explore how data shape local and regional cultural and gendered practices. We do this by looking at social media use, discourses of the digital city, and regional transformations through digital industries and infrastructures. The seminar unfolds partly in a "global classroom" format together with with students from Jinan (China) and Hsinchu (Taiwan) and their professors Sharon Ku (NYCU) and Xianghong Wu (Shandong University). In the global classroom students from the three countries meet and share their observations and experiences. We hope that the encounters between the students will generate direct experiences of socio-techical diversity.

The seminar will unfold in six blocks, all of which take place on campus. From here, we will collaborate online with China and Taiwan in four of the blocks.

- The first block will be a full day and will introduce the literature and approaches of the seminar through a combination of lectures, discussions and group work. Please note that this session will take place on 4 April 2024 - one week before the official start of lectures.

- The second, third and fourth blocks will be "research blocks" combined with the global classroom format. In the week before the meeting in the global classroom, students will receive small research assignments on cultural and gender aspects of either social media, smart city discourses and regional transformation. The tasks will involve small observations, conversations, and digital methods, all thoroughly described to limit the work time. Students will conduct the research in their own local context - in Bochum, in Jinan or in Hsinchu. In the global classroom on Thursday mornings, students will share their local observations in small groups and reflect together on the different observations made by students from the other countries. We aim to engage deeply with the three local contexts, practices, and experiences rather than limit ourselves to technical and impersonal comparisons.

- In the fifth block, students in the transnational groups will present their findings.

- The last block is reserved for a final discussion of the experiences of the intercultural encounters, and a theoretical discussion of the gender and cultural aspects of the socio-technical research observations.

The Global Classroom format is new at the RUB, and we are very interested in an open exchange about your experiences with it from a student perspective. With the exception of 4 April, the seminar will take place on Thursdays from 8:30-11:45 hrs and will end on 16 May.

On 20. April 10-16 hrs we organise an excursion to Rheinisches Revier to study the transformation of this region into a "Digital Park". Participation is optional.

The seminar is rather light on literature as we are aiming to provide some small hands-on experiences in empirical research with digital methods. Required reading will be provided in the moodle course. To give you an idea of the kind of literature, here are some titles that will probably be additional reading, as we try to find short texts:

Benjamin, R. (2019). *Race after technology: Abolitionist tools for the new Jim code*. Medford: Polity.

D'Ignazio, C., & Klein, L. F. (2023). *Data feminism*. Cambridge, MA: The MIT Press.

Haraway, D. J. (2016). *Staying with the trouble: Making kin in the Chthulucene*. Durham: Duke University Press. https://doi.org/10.1215/9780822373780

Martin, Mayers & Viseu (2015). *The politics of care in technoscience*. Social Studies of Science 45(5) 625–641, Thousand Oaks, CA: SAGE

Rogers, R. (2019). *Doing digital methods*. London, England: SAGE.

Tronto, J. C. (1998). *An Ethic of Care*. Generations: Journal of the American Society on Aging, 22(3), 15–20, New York, NY: JSTOR

Palit, N & Kramm, N. (2023). *Beyond A 'Noticing Stance' Reflecting to Expand Postdigital Positionalities*. Constructing Postdigital Research, P. 23-38, Cham, Schweiz: Springer. https://doi.org/10.1007/978-3-031-35411-3_2

Movie recommendation: Melfi, T. (2016). Hidden Figures.

051711 Situated Knowledge and Autotheory (MEW)

Seminar Mo 10-12 GB 1/144 Gunkel

Recently we witnessed an increasing interest among students in situated writing and thinking and in exploring academic texts that are written from a particular positionality. Situated knowledge has a long tradition in critical theory, particularly in feminist theory but also in Black Studies, Queer and Trans* Studies, and is currently also discussed as autotheory, e.g. by Lauren Fournier in the book *Autotheory as Feminist Practice in Art, Writing, and Criticism*, published in 2021.

In this seminar, we will read a number of key theoretical texts, starting from critical reflections to essayistic writing (Theodor Adorno, James Baldwin) and technologies of the self (Michel Foucault) before we move to Donna Haraway's seminal text on situated knowledge and Paul Preciado's more recent *Testo-Junkie* as an example of autotheory and Fournier's work. We will

discuss these texts alongside artistic practices and media works in which the audience/participants are addressed in their respective situatedness and often placed in relation to one another. As we will see, the works do not necessarily create a closed artificial world for a seemingly neutral subject, but rather activate the respective and multiple positionalities and the corresponding affective knowledge of the participants.

As such, the seminar is dedicated to situated knowledge as it is articulated in writing and various media projects and combine this theoretical engagements with practical exercises in situated academic writing.

030111	Philosophy of Artificial Intelligence: Concepts, Computation, & Connectionism (PHI)			
	Seminar	Wed 14-16	GA 04/187	Werning

This seminar delves into the philosophical questions surrounding Artificial Intelligence (AI), with a focus on the fundamental concepts it employs, the computational nature of intelligence, and the role of connectionism in AI development.

Key questions explored:

- What is intelligence? Can it be replicated in machines?
- What is the nature of computation? How is it related to thought and reasoning?
- Do AI systems possess concepts. Do they have cognition?
- What are the philosophical implications of symbolic and connectionist approaches to AI?
- Can AI achieve consciousness, free will, and true understanding?
- What are the ethical and societal implications of advanced AI?

Through critical discussions, readings, and presentations, you will engage with:

- Classical philosophers like Turing, Fodor, Searle
- Contemporary thinkers in AI and cognitive science
- Symbolic AI: Knowledge representation, reasoning systems, and compositionality
- Connectionist AI: Artificial neural networks, deep learning, and large language models
- Philosophical debates on consciousness, intentionality, and the mind-body problem

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

Buckner, C. J. (2024). *From deep learning to rational machines: What the history of philosophy can teach us about the future of artifical intelligence*. New York, NY: Oxford University Press.
Horgan, T., & Tienson, J. (1996). *Connectionism and the Philosophy of Psychology*. Cambridge, MA: MIT Press.
Macdonald, C., & Macdonald, G. (Eds.). (1995). *Connectionism*. Cambridge, MA: Blackwell.
Werning, M., Hinzen, W., & Machery, M. (Eds., 2012). The Oxford Handbook of Compositionality. Oxford: Oxford University Press.

030054	Introductory Math and Programming for Computational Philosophy (PHI)			
	Seminar	Tue 10-12	GABF 04/609	Yoo

This course, conducted in English, is complementary to "Agent-based Simulations in Philosophy" course (winter semester).

In recent years, many philosophical developments have made use of heavy computer simulations and gigantic data sets. However, it is a big challenge for philosophy students to engage in such studies, especially for those who lack the required foundations, such as computer programming or probability theory. This course aims to equip students with these foundational tools in programming and math, thus empowering students to engage in contemporary philosophical literature.
Thanks to the advances in modern technology and measurement techniques, scientists can carry out theoretical analyses that involve intense computations. Yet, these tools use large data sets and computer calculations and therefore come with the burden of mathematics and computer programming skills. Philosophers, too, have started to adopt methods relying on computers. For instance, epistemologists have started using computer simulation tools to examine knowledge in a social context where multiple agents interact with each other. The main points made in these works are accessible for a broader philosophical audience. But still, they require basic understanding of math and coding for a good comprehension, and furthermore replicating their arguments. This course aims to provide some of those basic requirements. Participants are not expected to have taken prior math courses. We plan to proceed step-by-step by starting with some seminal papers in the discipline of network epistemology. From then on, we go through matrix algebra, calculus, statistics, and graph theory. An introduction to Julia programming and practices will be included as we conclude each section. Evaluation (both graded and non-graded credits) is done by an exam focusing on key concepts: eigenvalues, differentiation, probability distribution, and centrality measures. Participants can earn extra exam points by submitting their Julia coding practices on these key concepts.

030104	The Ethics of Algorithmic Outsourcing (PHI)			
	Seminar	Wed 16-18	GABF 04/511	Titz

We inhabit a world where an extensive array of algorithmic tools is employed to incentivize, regulate, guide, and manipulate human behavior. Whether it is mapping out a route using Google Maps, tracking workouts and sleep patterns with a FitBit, or perusing film and book selections on platforms like Amazon or Netflix, it is hard to escape the influence of these algorithmic tools. Their widespread use raises crucial ethical questions.

This seminar focuses on the moral philosophical repercussions of these algorithmic tools on our day-to-day personal activities. What happens when we delegate or share numerous daily tasks and objectives with digital assistants and other algorithmic tools? More specifically, how does this impact our autonomy and freedom of choice? Algorithmic tools shape our choice environments by pre-filtering and highlighting options; they send reminders or incentives, and at times, they may even make decisions on our behalf. Does this pose a substantial new technological threat to individual autonomy? Another central question concerns their impact on our moral or intellectual abilities. While some delegation to technologies might make us more effi-

cient in moral or cognitive terms, it has been argued that excessive reliance on algorithms threatens to undermine our (intellectual) virtue development and leads to deskilling. In this seminar, we will address these and related issues while also keeping an eye on the positive potential of algorithmic outsourcing.

The literature will be made available in the Moodle course at the beginning of the semester.

030134 Economic Ethics

Seminar	Mo 14-16	GA 03/142	Steigleder

In contrast to business ethics, which focuses on the microethical problems of the moral responsibility of individual players in the economy, economic ethics is concerned with the macroethical or socio-ethical problems of the economy. Thus, topics of the seminar will be possible moral limits of markets, the welfare state, sweatshops, the resource curse, and development aid. An overarching question will be how moral problems can be sensibly addressed in a competitive economy.
The seminar is part of the master programs “European Culture and Economy” (ECUE) and “Ethics – Economics, Law, and Politics” (EELP). It may be also attended by a limited number of students of the master programs in philosophy and of advanced students in the bachelor’s degree course in philosophy.
The seminar will be taught in English. We will work with texts representing different and controversial viewpoints of the considered issues. At the beginning of the seminar, these essays will be provided as a download.

Please note: In advance of each week’s session, all participants are required to submit a summary of the text to be discussed in that session.

Useful reading:

Karl Homann, Competition and Morality, Wittenberg Center for Global Ethics, Discussion Paper 2006-4
William Easterly, The White Man’s Burden. Why the west’s efforts to aid the rest have done so much ill and so little good, Oxford: Oxford University Press, 2006.
Abhijit V. Banerjee, Ester Duflo, Poor Economics. A Radical Rethinking of the Way to Fight Global Poverty, New York: Public Affairs, 2011.

030129 Colloquium Digitale

Colloquium	Tue 16-18	GA 3/143	Weber-Guskar. Weydner-Volkmann

Forschungskolloquium zur Philosophie aller Themen, die mit digitaler Technik zu tun haben. Es werden Abschlussarbeiten und aktuelle Forschungsliteratur gelesen und diskutiert. Außerdem werden Gastvorträge eingeladen.
Bedingung für die Teilnahme ist die Anmeldung einer Abschlussarbeit in den Arbeitsbereichen „Ethik der digitalen Methoden und Techniken“ oder „Ethik und Philosophie der Emotionen“.

030119 Colloquium Philosophy of Information and Communication

Colloquium	Tue 12-14	GABF 04/358	Liefke

This colloquium (co-organized with Prof. Daniel Gutzmann, Germanistik) serves the discussion of current topics in semantics, pragmatics, and the philosophy of language. The colloquium combines talks by international experts with presentations of local researchers and (PhD/MA) students. Students will be given the opportunity to present their (ongoing) work in English. A detailed schedule will be available by mid-March at https://www.ruhr-uni-bochum.de/phil-inf/colloquium/index.html.en.

030132 Philosophy Meets Cognitive Science: Memory and Language

Colloquium	Tue 12-14	GA 04/187	Werning

In the research colloquium current topics at the interface between Philosophy and Cognitive Science will be discussed. The colloquium hosts talks by leading international experts and local researchers as well as presentations by doctoral and master students. Students will be given the (assisted) opportunity to present their projects in English.
This semester the sessions of the research colloquium will alternate in a bi-weekly rhythm between the topics “Memory” and “Language”. A detailed schedule will be published in due course at https://www.ruhr-uni-bochum.de/phil-lang/colloquium.html. Talks will be held either online via Zoom or in person.

030126 EXTRA Research Colloquium "Metaphilosophy, Experimental Philosophy, and Argumentation Theory"

Colloquium	Wed 16:30-18:00	GAFO 04/619	Horvath

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

030109 Einführung in die Philosophie der Künstlichen Intelligenz

Seminar	Wed 14-16	GABF 05/707	Horvath

In diesem einführenden Seminar wollen wir uns mit grundlegenden philosophischen Fragen und Problemen beschäftigen, die sich aus der rasanten Entwicklung und stark zunehmenden alltäglichen Anwendung von Systemen der Künstlichen Intelligenz (KI) ergeben. Dabei werden

wir unter anderem die folgenden Themen behandeln: Was ist KI, wie funktioniert sie und was kann sie schon? Welche Risiken und Chancen ergeben sich aus ihrer Anwendung? Führt der Einsatz von KI zum „Ende der Arbeit“ – und welche Fragen der sozialen Gerechtigkeit ergeben sich daraus? Kann aus KI eine Superintelligenz entstehen, die eine existenziellen Bedrohung für uns darstellt? Können KI-Systeme Geist und Bewusstsein entwickeln – und kann vielleicht auch unser eigener Geist „digitalisiert“ werden? Welche Bedeutung haben KI-Systeme im Bildungsbereich und für unser Verständnis von geistiger Urheberschaft?