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COURSE DESCRIPTIONS

Code of course: BMI-LOTD17-105E

Title of course: Metaphysics

Lecturer: Zhiwei Gu

General aim of the course:

The course offers a general introduction into some of the major problems of contemporary analytic metaphysics. By the end of this course, students who have done the required work will achieve a better understanding of the nature of reality and the methods of philosophy in acquiring this understanding.

Content of the course:

Metaphysics is a study of the most general categories in order to answer the questions what is real and what are the ultimate constituents of reality. In the course we will be addressing the following problems. What is existence? Under what conditions can an object retain its identity? Does time exist? How to understand modality? What is the nature of causation? Can agents be free and responsible if the world is deterministic?

Grading criteria, specific requirements:

All students taking the class for credit must submit a 500 word short paper on a topic discussed before week 7 and a 2000 word final paper on a topic agreed in advance with the instructor. The grade for the class will be the grade earned for the short paper and the final paper (25% and 75%, respectively), though in exceptional cases extra credit may be awarded for participation throughout the term.

Required reading:

Week 1: Metaphysics: The Big Questions (Van Inwagen&Zimmerman, "Introduction," 1-7)

Week 2-3: Willard V. Quine, "On What There is?" The Review of Metaphysics 2, no. 1 (1948) 21-38; Ben-Yami, "Is Existence a Quantifier?"

Week 4-5: E. J. Lowe, A Survey of Metaphysics (Chap 2); Peter Van Inwagen, Material Beings (chap 10)

Week 6-7: McTaggart - an Excerpt from *The nature of existence*, 67-74, in The Big Questions; C. D. Broad - an Excerpt from *Examination of McTaggart's Philosophy, 74-79,* in The Big Questions.

Week 8-10: David Hume, Constant Conjunction: *an Excerpt from A Treatise of Human Nature,* 221-225, in The Big Questions; J. L. Mackie-Causes and Conditions; E.J. Lowe-*Counterfactuals and Event Causation*, in A Survey of Metaphysics (Chap 10)

Week 11-12: Descartes, Correspondence between Rene Descartes and Princess Elisabeth of Bohemia; Michael Moriarty, The passion of the Soul and Other Late Philosophical Writings, 1-12;

Roger Woolhouse, Leibniz's Objection to Cartesian Interaction.

Week 13-14: Peter Van Inwagen, The incompatibility of free will and determinism; P.F. Strawson, Freedom and Resentment.

Suggested further reading:

Van Inwagen & D. Zimmerman (eds.) 1998: *Metaphysics: The Big Questions.* Oxford, Blackwell.

Farkas K. & T. Crane (eds.) 2004: *Metaphysics. A Guide and Anthology.* Oxford, Oxford University Press.

Lowe, E. J. 2002: *A Survey of Metaphysics*. OUP.

Loux, M. J. 1998: *Metaphysics: A Contemporary Introduction*. Londong, Routledge.

Code of course: BMI-LOTD17-202E

Title of course: Introduction to Philosophy of Language

Lecturer: Zsófia Zvolenszky

General aim of the course:

Introductory course into philosophy of language for students without prior background in philosophy or logic.

Content of the course:

Our words, sentences are about - refer to - things in the world: objects, people, events. Plausibly, the *meanings* of expressions play a central role in explaining this referential feature: for example, it is in virtue of the meaning of the word 'horse' that it refers to horses. But what exactly does this role played by meaning consist in? The answer is not at all straightforward. Consider these two sentences:

Joanne K. Rowling is a famous novelist.

Robert Galbraith is a famous novelist.

How does the meaning of the first sentence differ from the meaning of the second? After all, both are about the same individual: who is called Joanne K. Rowling but has become famous as J. K. Rowling, also writing under the pseudonym 'Robert Galbraith'. Yet - according to Gottlob Frege - the two sentences cannot have the same meaning because someone may rationally believe one (the first, say), without believing the other. This is what Frege's "puzzle" consists in, providing the starting point for 20th-century philosophy of language. In the seminar, our aim is to gain a greater understanding of the nature of meaning, and its relation to reference, truth, communication.

The aim of the course is to review and discuss central issues in philosophy of language based on influential primary and secondary texts.

- Frege on sense and reference, on proper names and definite descriptions
- Russell and Strawson on definite descriptions
- Kripke on proper names
- Kripke and Putnam on natural kind terms
- Context-sensitive expressions
- Quine on analyticity
- Grice on meaning
- Austin and Searle on speech acts
- Grice on communication
- Applications of Grice, Frege, Strawson: for example, pejorative language use

Grading criteria, specific requirements:

This course is a seminar with class discussion, student presentations, short quizzes and short writing assignments.

Required reading:

Alongside seminal texts in the philosophy of language (by Austin, Frege, Grice, Kripke, Quine, Strawson, Searle, Putnam), and a recent survey article on racism in language use (by Langton, Haslanger and Anderson), another functions as a "textbook":

W. Lycan 2008: *Philosophy of Language: A Contemporary Introduction*, 2nd edition. London: Routledge.

Seminal texts (by Austin, Frege, Grice, Kripke, Quine, Strawson, Searle, Putnam) can be found in the following anthology: P. Martinich and D. Sosa (eds.) 2012: *The Philosophy of Language*, 6th edition. Oxford, OUP.

(Previous editions are ok, except for Frege's "Sense and Reference", which appears in a different translation in earlier editions.)

Langton–Haslanger–Anderson's survey article "Language and Race" can be found in the following anthology of essays: G. Russell and D. G. Fara (eds.) 2012: *Routledge Companion to the Philosophy of Language*. New York, Routledge.

Code of course: BMI-LOTD17-202E

Title of course: Intensive Introduction to Philosophy of Language, for Logicians

Lecturer: Zsófia Zvolenszky

General aim of the course:

This course is a reading seminar that provides a speedier, advanced introduction to philosophy of language. Intended for students who have already taken at least one course in logic or linguistics. For students with an interest in logic and linguistics.

Content of the course:

This is a reading seminar about philosophical issues about linguistic meaning and communication. We'll be reading and discussing a new, 2019, textbook, *Philosophy of Language*, written by Zoltán Gendler Szabó and Richmond H. Thomasson.

I. Philosophy of Semantics:

Frege and Tarski

Compositionality

Reference and Quantification

Tense and Modality

Intentionality

II. Philosophy of Pragmatics:

Austin and Grice

Context and Content

Common Ground and Conversational Update

Implicature and Figurative Speech

Assertion and Other Speech Acts

III. Meaning as a Philosophical Problem

Meaning and Use

Externalism and Internalism

Grading criteria, specific requirements:

This course is a seminar with class discussion, student presentations and short writing assignments.

Required reading:

Zoltán Gendler Szabó and Richmond H. Thomasson 2019. *Philosophy of Language* (Cambridge Textbooks in Linguistics). Cambridge UP.

Code of course: BMI-LOTD17-205E

Title of course: Philosophy of Science

Lecturer: László E. Szabó

General aim of the course:

Web site: http://phil.elte.hu/leszabo/PhilSci/2020-2021-1

The course provides an introduction to modern analytic philosophy of science. I shall focus on the central epistemological problems concerning empirical sciences like physics; and I shall discuss these issues on a formal/logical basis. Finally I sketch a naturalized philosophy of science based on what I call physico-formalist philosophy of mathematics -- an account for scientific knowledge, both a priori and empirical, within a purely physicalist ontology.

Content of the course:

characterization of scientific knowledge
science in social context
traditional methodology of empirical science
scepticism concerning empirical knowledge
truth of fact vs. truth of reasoning dichotomy
the Kantian tradition
philosophy of logic and mathematics
scientific theory as partially interpreted formal system
semantics of scientific theory
the physicalist approach
meaning and truth
holistic conclusions
operationalism and the constitutive a priori
empirical underdetermination
scientific knowledge in the context of the natural world

Grading criteria, specific requirements:

Oral exam from the material of the lectures. Video records and the slides of the lectures will be available.

Required reading:

Alexander Bird: *Philosophy of Science* (Fundamentals of Philosophy), Routledge, 1998.

L. E. Szabó: Meaning, Truth, and Physics, In G. Hofer-Szabó, L. Wroński (eds.), *Making it Formally Explicit*, European Studies in Philosophy of Science 6. (Springer International Publishing, 2017) DOI 10.1007/978-3-319-55486-0_9. (Preprint: http://philsci-archive.pitt.edu/14769/)

Suggested further reading:

David A. Truncellito: Epistemology, Internet Encyclopedia of Philosophy, https://www.iep.utm.edu/epistemo/

Thomas Uebel: Vienna Circle, *The Stanford Encyclopedia of Philosophy* (Spring 2013 Edition), Edward N. Zalta (ed.) (http://plato.stanford.edu/entries/vienna-circle/)

John Vickers: The Problem of Induction, *The Stanford Encyclopedia of Philosophy* (Spring 2013 Edition), Edward N. Zalta (ed.) (http://plato.stanford.edu/entries/induction-problem/)

Robert Sinclair: Quine's Philosophy of Science, *Internet Encyclopedia of Philosophy* (http://www.iep.utm.edu/quine-sc)

L. E. Szabó: Mathematical facts in a physicalist ontology, *Parallel Processing Letters*, **22** (2012) 1240009 (12 pages), DOI: 10.1142/S0129626412400099 [preprint]

L. E. Szabó: Formal Systems as Physical Objects: A Physicalist Account of Mathematical Truth, *International Studies in the Philosophy of Science*, 17 (2003) pp. 117-125. (preprint: PDF)

T. Kuhn: Scientific Revolutions, in *The Philosophy of Science*, R. Boyd et al. (eds.), MIT Press 1991, pp. 139-157.

Code of course: BMI-LOTD17-206E

Title of course: Chance, Causality, and Determinism in Quantum Mechanics

Lecturer: László E. Szabó

General aim of the course:

Web site: http://phil.elte.hu/leszabo/QM/2020-2021-1

The lecture course provides introduction to the basic issues in foundations of quantum mechanics, with special focuses on the determinism–indeterminism problem.

Content of the course:

The worldview of the end of 19th century physics: determinism, locality, Markovity
The fundamental conceptions of QM
QM as non-classical probability theory
Classical probability theory
Interpretations of probability
Probability on Hilbert lattice
Relationship between quantum and classical probability
Quantum logic
Two different interpretations of quantum probability

The measurement paradox
Two different interpretations of the wave function
The measurement paradox and its popular formulations (Schrödinger's cat, etc.)
No Go theorems of QM
Neumann theorem
Jauch--Piron theorem
Kochen--Specker theorem
The Einstein--Podolsky--Rosen argument
"Laboratory Record" theorem
Bell theorem
Reichenbach's common cause principle
Greenberger--Horne--Zeilinger theorem
No Go theorems and determinism
Free will and QM
The context of the probem of free will
The Newcomb paradox
Phenomenology of free will
Free will and QM
Possible Resolutions
The "Kolmogorovian Censorship" hypothesis
Arthur Fine's Interpretation of Quantum Statistics

Grading criteria, specific requirements:

Oral exam from the material of the lectures. Video records and the slides of the lectures will be available.

Required reading:

The slides and lecture notes to the course, which will be available in PDF form.

L. E. Szabó: The Einstein-Podolsky-Rosen Argument and the Bell Inequalities, *Internet Encyclopedia of Philosophy* (2008)

Suggested further reading:

E. Szabó László: *A nyitott jövő problémája - véletlen, kauzalitás és determinizmus a fizikában*, Typotex Könyvkiadó, Budapest, 2002. (**PDF**) (L. E. Szabó, *The Problem of Open Future: Chance, Causality, and Determinism in Physics*, draft manuscript will be available)

Michael Redhead: *Incompleteness, Nonlocality, and Realism: A Prolegomenon to the Philosophy of Quantum Mechanics* (Clarendon Paperbacks) [elérhető az olvasóteremben is]

H. Reichenbach: *Philosophic Foundations of Quantum Mechanics*, University of California Press, 1944. [elérhető az olvasóteremben]

Bas C. van Fraassen: *Quantum Mechanics: An Empiricist View* (Clarendon Paperbacks) [elérhető az olvasóteremben]

Pitowsky, I., *Quantum Probability - Quantum Logic* (Lecture Notes in Physics 321), Springer, Berlin, 1989.

M. Rédei: *Quantum Logic in Algebraic Approach* (Fundamental Theories of Physics Vol. 91.) Kluwer Academic Publishers, Dordrecht, Boston and London, 1998. (chapter 5.)

L. E. Szabó and Arthur Fine: A local hidden variable theory for the GZH experiment, *Physics Letters* A295 (2002) pp. 229-240. https://arxiv.org/abs/quant-ph/0007102

L. E. Szabó: Critical reflections on quantum probability theory, in M. Rédei, M. Stoeltzner (eds.), *John von Neumann and the Foundations of Quantum Physics, Vienna Circle Institute Yearbook 2001*, Kluwer, Dordrecht. http://philosophy.elte.hu/leszabo/neumann/neumann.pdf

L. E. Szabó: What remains of probability? in D. Dieks, W. Gonzalez, S. Hartmann, M. Weber, F. Stadler and T. Uebel (eds.), *The Present Situation in the Philosophy of Science*, Springer, forthcoming. [PDF]

L. E. Szabó: Objective probability-like things with and without objective indeterminism, *Studies in History and Philosophy of Modern Physics* 38 (2007) 626–634 [Prepirnt (PDF)]

G. Hofer-Szabó, M. Rédei, L. E. Szabó: *The Principle of the Common Cause*, Cambridge University Press, 2013.

Code of course: BMI-LOTD-307E

Title of course: Alternative Set Theories

Lecturer: Péter Mekis

General aim of the course:

The course provides a philosophical introduction to the basic ideas, concepts, and methods of set theory through comparison of various axiom systems.

Content of the course:

We investigate the philosophical foundations of the concepts of set, proper class and elementhood through axiom systems outside of the Zermelo-Fraenkel Spectrum:

Naive set theory

Gödel-Bernays set theory and Morse Kelley set theory

Second-Order logic as set theory

Type Theory as set theory

The Quine family: New Foundations, ML NFU, and their akins

Ackermann set theory

Positive set theories

Funny theories: Pocket set theory, Double Extension set theories

Grading criteria, specific requirements:

Familiarity with standard first-order predicate logic is a prerequisite. Math background is not.

Required reading:

A concise introduction to the topic can be found in the Stanford Encyclopedia of Philosophy: https://plato.stanford.edu/entries/settheory-alternative/

Suggested further reading:

TBA

Code of course: BMI-LOTD-106E

Title of course: Philosophy of Perception

Lecturer: Zhiwei Gu

General aim of the course:

The goal of the course is to provide an overview of the problem of perception and its significance in the philosophy of mind. By the end of this course, students who have done the required work will:
understand the main historical background of the contemporary debate of philosophy of perception
understand the main positions in the contemporary debate
understand the significance of the debate for the philosophy of mind as a whole.

Content of the course:

This course will introduce the contemporary problem of perception—the nature of perceptual experience—first by tracing its historical origins in early modern philosophy, and then by examining how this frames the recent debates in the philosophy of perception. We will discuss the problem of illusion as it arose in Berkeley's idealism and in Hume's skepticism. We will then examine the contemporary version of the argument from illusion and Austin's treatment. We will then move to the argument from hallucination, and discuss how representationalists cope with it. On the way we will look at the problem of the representationalism. Alternatively, we will consider naive realism as the solution to both the arguments from illusion and hallucination, and its potential in addressing the problem of consciousness.

Grading criteria, specific requirements:

All students taking the class for credit must submit a 500 word short paper on a topic discussed before week 7 and a 2000 word final paper on a topic agreed in advance with the instructor. The grade for the class will be the grade earned for the short paper and the final paper (25% and 75%, respectively), though in exceptional cases extra credit may be awarded for participation throughout the term.

Required reading:

Week 1**:** Tim Crane, What is the problem of perception (2005)

Week 2-3: Berkeley, Three dialogues between Hylas and Philonous (first dialogue); Hume, A Treatise of Human Nature 1.4.2 „Of scepticism with regard to the senses"

Week 4-5: Howard Robinson, Perception (chap 2); J. L. Austin, Sense and sensibilia

Week 6: Howard Robinson, Perception (chap 6)

Week 7-9: Fred Dretske, Naturalizing the mind (chap 1); Tim Crane, Is perception a propositional attitude; Harold Langsam, Why intentionalism cannot explain phenomenal character

Week 10-11: William Fish, Philosophy of Perception: A contemporary introduction (chap 6); Keith Allen, Hallucination and Imagination

Week 12-13: Frank Jackson, Epiphenomenal qualia; Keith Allen, A naive realist theory of colour (chap 9)

Week 14: concluding thought

Suggested further reading:

A.D. Smith, The problem of perception.

Code of course: BMI-LOTD-101E

Title of course: Logic seminar

Lecturer: Márton Gömöri

General aim of the course:

The course provides an introduction to the basic concepts and methods of formal logic.

Content of the course:

The course covers the following topics:

Truth and valid inference

Aristotelian syllogisms

Propositional logic

Elements of predicate logic

Aristotelian vs. recursive definitions

Types of relations

Grading criteria, specific requirements:

Grading is based on homeworks.

Required reading:

J. Barwise and J. Etchemendy, *Language, Proof and Logic.* CSLI Publications, 2011.

Suggested further reading:

L. T. F. Gamut, *Logic, Language, and Meaning. Volume I: Introduction to Logic*. University of Chicago Press, 1991.

Code of course: BMI-LOTD17-207E

Title of course: Philosophy of Science Seminar

Lecturer: Márton Gömöri, László E. Szabó

General aim of the course:

Web site: http://phil.elte.hu/leszabo/TudfilSzeminarium/2020-2021-1

The aim of the course is to review and discuss the most important issues in philosophy of science, on the bases of the following readings:

M. Schlick: Positivism and Realism, in *The Philosophy of Science*, R. Boyd et al. (eds.) The MIT Press, Boston 1992.

M. Schlick: Pozitivizmus és realizmus. in *A Bécsi Kör Filozófiája*/, Szerk. Altrichter F. (Gondolat, 1972) pp. 93-133.

H. Reichenbach: Meaning, in *Experience and Prediction: An Analysis of the Foundations and the Structure of Knowledge*

P. Bridgman: The Operational Character of Scientific Concepts, in *The Philosophy of Science*, R. Boyd et al. (eds.) The MIT Press, Boston 1992.

A. Garfinkel: Reductionism, in *The Philosophy of Science*, R. Boyd et al. (eds.) The MIT Press, Boston 1992.

T. Kuhn: Scientific Revolutions, in *The Philosophy of Science*, R. Boyd et al. (eds.) The MIT Press, Boston 1992.

Arthur Fine: The Natural Ontological Attitude, in *The Philosophy of Science*, R. Boyd et al. (eds.) The MIT Press, Boston 1992.

M. Colyvan: Indispensability Arguments in the Philosophy of Mathematics, *The Stanford Encyclopedia of Philosophy* (Fall 2004 Edition), Edward N. Zalta (ed.).

W. V. O. Quine: Two Dogmas of Empiricism, *Philosophical Review* 60 (1951) 20–43.

W. V. O. Quine: On Empirically Equivalent Systems of the World, Erkenntnis 9 (1975), pp. 313-328.

B. van Fraassen: Arguments concerning scientific realism, Ch. 2 in *The Scientific Image*, Oxford University Press Inc., New York 1980.

W. V. O. Quine: Epistemology Naturalized, in: *Ontological Relativity and Other Essays*, Columbia University Press, New York.

L. E. Szabó: Meaning, Truth, and Physics, In G. Hofer-Szabó, L. Wroński (eds.), *Making it Formally Explicit*, European Studies in Philosophy of Science 6. (Springer International Publishing, 2017) DOI: 10.1007/978-3-319-55486-0_9. (Preprint: http://philsci-archive.pitt.edu/12891/)

L. Carroll: "What the Tortoise Said to Achilles" which is available here: http://www.ditext.com/carroll/tortoise.html

Selection from Plato's Meno. The text is available from the online library. The item is "The Dialogues of Plato, Volume 1: Euthyphro, Apology, Crito, Meno, Gorgias, Menexenus", please read the section "A Proof of Recollection" (pp. 164-171)

Hilary Putnam, Brains in a vat, http://ieas.unideb.hu/admin/file_2908.pdf

Bruce MacLennan, "Synthetic Ethology - An Approach to the Study of Communication". In *Artificial Life II: The Second Workshop on the Synthesis and Simulation of Living Systems*, Santa Fe Institute Studies in the Sciences of Complexity, proceedings Vol. X, edited by Christopher G. Langton, Charles Taylor, J. Doyne Farmer, and Steen Rasmussen. Redwood City, CA: Addison-Wesley, 1992, pp. 631-658. (Available from the online library.

Grading criteria, specific requirements:

Preparing from the corresponding papers + a 45-minute seminar talk + active participation in the discussions.

Code of course: BMI-LOTD-309E

Title of course: Programming for Logicians

Lecturer: Péter Mekis

General aim of the course:

The course provides a philosophical introduction to the basic ideas, concepts, and methods of computer programming through Haskell, a programming language that has its roots in formal logic.
The course is mainly for beginners, but it might be interesting for students with advanced programming knowledge, too, since Haskell's purely functional approach differs considerably from the mainstream imperative programming paradigm (like C or Python).

Content of the course:

In the first six sessions we explore Haskell, covering the following topics:
Basic syntax: defining and calling functions in Haskell
Elementary and advanced examples of recursion
Higher-order functions
Data types and type classes
Functors, applicatives, and monads
Haskell as an extension of the lambda calculus.
In the second half of the course we will work on projects, based upon the students' ideas. In previous courses we implemented Conway's game of life, propositional logic, and Markov algorithms.

Grading criteria, specific requirements:

Familiarity with standard first-order predicate logic is a prerequisite. Programming background is not.

Required reading:

Miran Lipovaca, *Learn you a Haskell for Great Good!* 2011.

Suggested further reading:

Kees Doets and Jan van Eijck, *The Haskell Road to Logic and Mathematics*. 2004.
Christopher Allen and Julie Moronuki, *Haskell Programming from First Principles*. 2017.

Code of course: BMI-LOTD-315E

Title of course: Gödel's Theorems from the Point of View of Physicalist Philosophy

Lecturer: László E. Szabó

General aim of the course:

Web site: http://phil.elte.hu/leszabo/Godel/2020-2021-1

What is logic? What makes the rules of logic "correct"? What makes a mathematical statement "true"? Mathematical truth vs the truth in physics.
The formalist philosophy of mathematics vs. mathematical platonism, etc.
Physicalism in general. The physicalist philosophy of mathematics.
Introduction to the first order predicate logic: language, axioms, derivation rules, proof, etc. Interpretation and model. Meta-theory.
Examples for first order axiomatic systems: group theory, Euclidean geometry (Tarski axioms), Peano arithmetic, set theory.
Gödel's numbering. Representation of meta-theoretic sentences in the object theory. Gödel's first incompleteness theorem (with proof). Gödel's second incompleteness theorem (with proof).
The usual interpretation of the theorems and their philosophical relevance. Related similar topics: halting problem and computability, self reference and endophysics.
Criticism of the usual interpretations from a formalist/physicalist point of view.

Grading criteria, specific requirements:

Oral exam from the material of the lectures. Video records and the slides of the lectures will be available.

Required reading:

J. N. Crossley, et al., What is Mathematical Logic? Dover Publications, New York, 1990.
L. E. Szabó: Formal Systems as Physical Objects: A Physicalist Account of Mathematical Truth, International Studies in the Philosophy of Science, **17** (2003) 117. (preprint: PDF)

Suggested further reading:

K. Gödel: *On formally undecidable propositions of principia mathematica and related systems*, Oliver and Boyd, Edinburgh, 1962.
E. Nagel and J. R. Newman: *Gödel's Proof*, New York Univ. Press, 1958.
Mathematical facts in a physicalist ontology, *Parallel Processing Letters*, 22 (2012) 1240009 (12 pages), DOI: 10.1142/S0129626412400099 [preprint]
A. G. Hamilton: *Logic for mathematicians*, Cambridge Univ. Press, 1988.
L. E. Szabó: Meaning, Truth, and Physics, In G. Hofer-Szabó, L. Wroński (eds.), *Making it Formally Explicit*, European Studies in Philosophy of Science 6. (Springer International Publishing, 2017) DOI 10.1007/978-3-319-55486-0_9. (Preprint: http://philsci-archive.pitt.edu/14769/)

Code of course: BMI-LOTD-316E

Title of course: A historical introduction into the philosophy of mathematics

Lecturer: András Máté

General aim of the course:

Introduction to the problems of the philosophy of mathematics and its classical schools, with an outlook to the contemporary debates.

Content of the course:

The nature of mathematical objects and mathematical knowledge has been an important question in European philosophy since Plato and Aristotle. However, philosophy of mathematics as a substantive branch of philosophy closely connected with foundational research in mathematics originates with Frege's Foundations of Arithmetics (1884). Frege's work - as well as the works of his contemporaries - answered a problem situation formed by the developments of 19th century mathematics, but it led to a new problem situation because Frege's and Cantor's answer was encumbered by the same paradox. Their followers tried to eliminate the possibility of occurrence of paradoxes in mathematics in different ways. These endeavours led to the formation of the schools that are called the classical schools in philosophy of mathematics: logicism, formalism and intuitionism. They are not just philosophical opinions about mathematics, but research programs in the foundations of mathematics as well. The course presents this historical process from the problem situation in 19th century mathematics to the results of foundational research in the nineteen-thirties.

Contents of the course:

Developments and problems in 19th century mathematics

Bolzano, Cantor and the infinite

Frege's logicism and his construction of natural numbers

Dedekind's construction of natural numbers

New paradoxes of infinity – the first fall of logicism

The logicism of Russell and Ramsey

Hilbert's program and the arithmetisation

Brouwer's intuitionism

Gödel's theorems and the second fall of logicism

The paradox of the liar and the indefinability of truth

Decision problem, Church-thesis, Church(-Turing)-theorem

Grading criteria, specific requirements:

For the grade, the student should produce a presentation about some subject connected with the topic of the course. It will be discussed at a "house conference" in the exam period. (S)he should participate in the discussion of the presentations of the other students, too.

Required reading:

Benacerraf, P. – H. Putnam (eds.): Philosophy of mathematics, Cambridge U.P., 1983.

van Heijenooort, J. (ed.): From Frege To Gödel: A Source Book in Mathematical Logic, 1879-1931. Harvard U. P.; reprinted with corrections, 1977.

Mancosu, P. (ed.): From Brouwer to Hilbert. The Debate on the Foundations of Mathematics in the 1920s, Oxford, Oxford University Press, 1998.