Institut für Philosophie an der Universität Wien. Fakultät für Philosophie und Bildungswissenschaft.
180178 KU *Mathematical Intuitionism* (2019S). 5.00 ECTS (2.00 SWS), SPL 18 – Philosophie (Prüfungsimmanente Lehrveranstaltung) NIG Universitätsstraße 7/Stg. II/3. Stock, 1010 Wien

Mathematical Intuitionism

Prof. Luca Oliva

Course Description

The course introduces and analyses some issues of epistemology and philosophy of mathematics that fall under the label 'intuitionism'. Our overview of intuitionism starts with the classic introductions of Shapiro and Pust, who outline the notion of intuition in mathematics and epistemology, respectively. Hence emerges the significance of the notion for the mathematical and the philosophical practice. Statements such as "if not-not-*p*, then *p*" represent a source of evidence for further statements. The former statements are usually called intuitions. In this sense, all logical tautologies, natural deduction, and algebraic axioms are intuitive. Logical justifications and mathematical foundations equally rely on such evidence. The course will first explore the turning point of intuitionism represented by the Kantian account, where mathematical statements are reduced to intuition-based constructions. This part refers to the readings of Hintikka, Parsons, Posy, and Maddy. From the Kantian account, Brouwer seems to derive the intuition of two-oneness, the basal intuition of his mathematics, which creates not only the numbers one and two, but also all finite ordinal numbers. Our analysis of Brouwer's algebraic intuitionism will include Heyting and Dummett. In relation to Brouwer, we will also consider the perceptual intuitionism of Gödel and Hilbert in the readings of Burgess and Parsons, and Tieszen's account of Husserl's phenomenological intuition. Common to all mathematical intuitionists is the idea that a mathematical statement corresponds to a mental construction, and a mathematician can assert the truth of a statement only by verifying the validity of that construction by intuition. The last two parts of our course are devoted to epistemic intuitions. In epistemology, intuitions offer the ultimate evidence or justification for our theories (Chudnoff). However, lately, some scholars such as Cappellan were influenced by deflationist readings of Lewis and Williamson, who reduce intuitions to beliefs or dispositions to believe. We will finally devote our attention to their arguments.

Schedule of Class

2|5	4:45 – 6:15 (3C)	Introduction to Intuitionism (Pust, Schapiro)
9|5	4:45 – 6:15 (3C)	Mathematical and Logical Instances (Set Theory)
16|5	4:45 – 6:15 (3C)	Kantian Intuitionism (Kant)
23|5	4:45 – 6:15 (3F)	Kantian Intuitionism (Hintikka, Parsons, Posy, Maddy)
	6:30 – 8 (3F)	Phenomenological Intuition (Sokolowsky, Zahavi)
29|5	4:45 – 6:15 (3B)	Phenomenological Intuition (Tieszen, Husserl)
6|6	4:45 – 6:15 (3C)	Mathematical Intuitionism (Brouwer, Heyting)
	6:30 – 8 (3F)	Mathematical Intuitionism (Dummett)
13|6	4:45 – 6:15 (3C)	Quasi-Intuitionism (Wittgenstein)
27|6	4:45 – 6:15 (3C)	Deflationist Theories (Cappellan, Chudnoff, Williamson)

Assignments and Assessments

Here is the list of assignments and their corresponding value. (1) Attendance and participation, tests (20%), (2) a summary of one class subjects (20%), (3) an argumentative and comprehensive final paper (4000 words) on the theoretical parts of the class (60%).

Plagiarism or other forms of cheating will be reported and penalized. Look at the University of Vienna bylaws for details on academic honesty, disabilities, and other matters about students and life on campus.

Bibliography

Luitzen E. J. Brouwer, "Intuitionism and Formalism". In P. Benacerraf and H. Putnam (eds), *Philosophy of Mathematics*. Cambridge 1984: 77-89.

Hermann Capellan, *Philosophy without Intuitions*. Oxford, 2012.

Elijah Chudnoff, *Intuition*. Oxford 2013.

Michael Dummett, *Elements of Intuitionism*. Oxford, 1977.

Arend Heyting, *Intuitionism*. Amsterdam: North-Holland, 1956.

Immanuel Kant, *Critique of Pure Reason*. P. Guyer and A. Wood (eds). Cambridge, 1998.

Penelope Maddy, *Realism In Mathematics*. Oxford, 1990.

D.C. McCarty, "Intuitionism in Mathematics". In S. Shapiro (ed), *The Oxford Handbook of Philosophy of Mathematics and Logic*. Oxford 2005: 356-86.

Charles Parsons, "Mathematical Intuition". *Proceedings of the Aristotelian Society* 80, 1979-1980: 145-68.

Charles Parsons, *Mathematical Thought and Its Objects*. Cambridge 2008.

Charles Parsons, "Platonism and Mathematical Intuition in Kurt Gödel's Thought". *The Bulletin of Symbolic Logic* 1/1, 1995: 44-74.

Charles Parsons, "Reason and Intuition". *Synthese* 125/3, 2000: 299-315.

Michael Potter, *Reason's Nearest Kin: Philosophies of Arithmetic from Kant to Carnap*. Oxford, 2000.

Joel Pust, "Intuition". *Stanford Encyclopedia of Philosophy*, 2017.

Stewart Shapiro, *Thinking About Mathematics*. Oxford, 2000.

Gila Sher and Richard L. Tieszen (eds), *Between Logic and Intuition*. Cambridge 2000.

Sokolowsky, *Introduction to Phenomenology*. Cambridge 2000.

Richard Tieszen, "Gödel and the Intuition of Concepts". *Synthese*, 133/3, 2002: 363-91.

Richard Tieszen, *Mathematical Intuition. Phenomenology and Mathematical Knowledge*. Kluwer 1989.

Mark Van Atten, "Luitzen Egbertus Jan Brouwer". *Stanford Encyclopedia of Philosophy*, 2017.

Timothy Williamson, *The Philosophy of Philosophy*. Blackwell, 2007.

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