Categories for the working philosopher

John Dougherty WiSe 2023/24

Meeting:	Fridays, 14:00–16:00 (s.t.) Ludwigstr. 31 / 021
Office Hours:	Thursdays, 14:00–16:00, or by appointment Ludwigstr. 31 / 131
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Overview

Description This course is an introduction to category theory and its uses in mathematical philosophy. The first half of the course will be an introduction to the formalism of categories and some basic results. In the second half of the course, we will read and discuss papers from philosophy journals and edited volumes that apply category theory to philosophical questions.

Objectives By the end of the course, you should be able to (i) define basic objects in category theory (e.g., categories, functors, natural transformations) and prove basic results (e.g., the Yoneda lemma); (ii) formulate one or more philosophical claims that use category theory in their formulation or defense; and (iii) evaluate these claims. Exhibiting ability (i) means giving a statement, in academic writing, of a question—or inconsistency, paradox, puzzle, or similar—along with an explanation of why it poses a problem for some particular philosophical view. Exhibiting ability (ii) means describing, again in academic writing, a new or existing attempt to answer this question and explaining why this is or is not a plausible answer.

Assessment

The evaluation for this course will be by means of a term paper submitted at the end of the semester. If you would like to submit a term paper, you must register through LSF during the registration period (15.01–26.01.2024) and submit it to me by email by the term paper deadline (TBD). Please note that extensions of this deadline are not up to me; if you need an extension, please contact Fabian Widerna (`f.widerna@lmu.de`) at the Prüfungsamt für Geistes- und Sozialwissenschaften (PAGS).

Your paper should be on a topic related to category theory and philosophy. I will distribute a list of suggested questions and grading criteria before the registration period. You may write your paper on topic not on that list; if you do, then I recommend speaking to me before writing the paper, so that I can advise on the topic and scope of your planned alternative. The term paper should be 3000 words for BA students and 6000 words for MA students. In either case, it should be written in 12pt font, with 1.5 spacing, 3cm margins on the left and right, and a standard academic typeface (Computer Modern, Palatino, Times New Roman, Calibri, etc.).

Resources

Questions about the administration of philosophy teaching at LMU should be directed to Thomas Wyrwich (`thomas.wyrwich@lrz.uni-muenchen.de`). The Erasmus coordinator for philosophy at LMU is Peter Adamson (`office.peter.adamson@lrz.uni-muenchen.de`). The list of women's representatives (Frauenbeauftragte) for the Philosophy Faculty can be found on the Faculty's webpage (`https://www.philosophie.uni-muenchen.de/fakultaet/frauenbeauftragte/index.html`). Issues regarding the economic, social, and cultural aspects of student life—including studying with a child or studying with a disability—are the responsibility of the Munich Student Union (`https://www.studentenwerk-muenchen.de`).

Schedule of topics

20.10 Introduction and universal properties

27.10 Naturality and functors

03.11 Categories and representability

10.11 Equivalence

17.11 Monoidal categories

24.11 Strictification and coherence

01.12 Concreteness

08.12 Wrap up on category theory

15.12 [RESCHEDULE] Feferman, S. (1977). Categorical foundations and foundations of category theory. In Butts, R. E. and Hintikka, J., editors, *Logic, Foundations of Mathematics and Computability Theory*, pages 149–169. Springer.

22.12 [RESCHEDULE] Landry, E. (2012). The genetic versus the axiomatic method: Responding to Feferman 1977. *The Review of Symbolic Logic*, 6(1):24–51

29.12 [HOLIDAY]

05.01 [HOLIDAY]

12.01 Landry, E. (2007). Shared structure need not be shared set-structure. *Synthese*, 158:1–17

19.01 Halvorson, H. (2013). The semantic view, if plausible, is syntactic. *Philosophy of Science*, 80(3):475-478.

26.01 Barrett, T. W. (2022). How to count structure. *Noûs*, 56(2), 295–322

02.02 Weatherall, J. O. (2021). Why not categorical equivalence?. In Madarász, J. and Székely, G., editors, *Hajnal Andréka and István Németi on Unity of Science* pages 427-451. Springer.

09.02 List, C. (2019). Levels: Descriptive, Explanatory, and Ontological. *Noûs*, 53:852–883.