



**Academic Year 2025-2026
Syllabus
Logic and Philosophy of Science
CFU 6
Dr. Gabriele Pulcini**

Course Description

Reasoning is the process of extracting useful consequences from some sort of preassigned background knowledge. Logic concerns itself with correct reasoning and so, specularly, with detecting fallacious arguments. Needless to say, logic proves to be fundamental in any intellectual arena, including economics and politics; It also provides the basic toolkit for reflecting upon the methodology of empirical sciences and the nature of scientific knowledge.

The course is organized in two parts. The first will serve as an introduction to both classical propositional logic and the predicate calculus. Students will learn how to 'extract' the logical structure of sentences expressed in the natural language by means of the formalization process. They will also be trained to analyze formalized sentences by computing truth-tables and applying the method of refutation trees. Special attention will be devoted to the notions of valid argument.

In the second part, students will be introduced to some of the central topics in the philosophy of science. These include the difference between deductive and inductive reasoning, Popper's falsificationism, Kuhn's philosophical theory about scientific revolutions, the realism/antirealism debate as well as other central topics in general philosophy of science.

Teaching Method

The instructor will give lectures (around 70% of the time) and also lead practicals (around 30% of the time). During practicals, students will have the opportunity to interact with each other, as well as with the teacher, in order to solve given exercises and face concrete situations.

Schedule of Topics

Topic 1	The language of propositional classical logic
Topic 2	Truth tables, tautologies, and contradictions
Topic 3	The language of predicate calculus and identity relation
Topic 4	Truth in a model, logical validity, countermodels
Topic 5	Formalization of natural language sentences
Topic 6	Deductive <i>vs</i> inductive reasoning
Topic 7	Poppers criticism of inductivism and falsifications
Topic 8	Kuhn on scientific revolutions
Topic 9	The realism/antirealism debate
Topic 10	Other key topics in the philosophy of science

Textbooks:

J. Nolt, A. Rohatyn, and A. Varzi. *Logic*, McGraw-Hill (Chapters 3 and 6)

P. Godfrey-Smith. *Theory and Reality: An Introduction to the Philosophy of Science*, Univ. of Chicago Press.

Non-attending students are also required to read the following text:

S. Okasha. *Philosophy of Science*, OUP

Assessment

The final exam consists in a written test in which the students will be asked to solve exercises in logic (propositional and first order) as well as to answer open questions concerning the part on the philosophy of science.

Non attending students will be asked to read an additional text concerning the second part of the course (cf. the textbooks section). As for the final test, they will have extra time to answer some specific questions regarding the required additional text.

Office hours

Schedule a Skype meeting by contacting me at the following address:

gabriele.pulcini@uniroma2.it

NOTE: If you are an Erasmus or a non Global Governance student who would like to attend one or more courses in the Global Governance programme, please be aware that, **before enrolling in the course**, you should have read the code of conduct and the procedural rules characterizing our programme. We assume that, if you enroll in the course, **you have read and accepted all Global Governance values and rules**. Notice that attendance is expected from the very first lesson and you need to attend at least 80% of the course to be considered an attending student.

Description of the methods and criteria for testing learning

The examination assesses the student's overall preparation, ability to integrate the knowledge of the different parts of the programme, consequentiality of reasoning, analytical ability and autonomy of judgement. In addition, language property and clarity of presentation are assessed, in accordance with the Dublin descriptors (1. knowledge and understanding; 2. applying knowledge and understanding; 3. making judgements; 4. learning skills; 5. communication skills).

The examination will be graded according to the following criteria:

Unsuitable: important deficiencies and/or inaccuracies in the knowledge and understanding of the topics; limited capacity for analysis and synthesis, frequent generalisations and limited critical and judgement skills; the topics are exposed in an incoherent manner and with inappropriate language.

18-20: barely sufficient knowledge and understanding of the topics, with possible generalisations and imperfections; sufficient capacity for analysis, synthesis and autonomy of judgement; the topics are frequently exposed in an inconsistent manner and with inappropriate/technical language;

21-23: surface knowledge and understanding of the topics; ability to analyse and synthesise correctly with sufficiently coherent logical argumentation and appropriate/technical language.

24-26: fair knowledge and understanding of the topics; good analytical and synthetic skills with rigorously expressed arguments but not always appropriate/technical language.

27-29: complete knowledge and understanding of the topics; considerable capacity for analysis and synthesis. Good autonomy of judgement. Arguments presented in a rigorous manner and with appropriate/technical language.

30-30L: very good level of knowledge and thorough understanding of topics. Excellent analytical and synthetic skills and independent judgement. Arguments expressed in an original manner and in appropriate technical language.
