PHI142: INTRODUCTION TO LOGIC

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§1. Description. One of the oldest intellectual disciplines in human history is logic. It has been studied as a sub-discipline of philosophy for over 2400 years, with its most recent rigorous articulation in the early twentieth century making it an integral part of the foundations of mathematics and leading to the development of computer science. Logic is primarily concerned with the systematic study of evaluating arguments and the fundamental rules of good reasoning. Most intellectual processes require reasoning, and logic serves as a justificatory tool in disciplines of knowledge such as mathematics, natural science, and computer science. The goal of the course is to improve your skills in logical thinking and understanding various types of arguments that you may encounter in your studies and throughout your life. This course will introduce you to formal methods for representing and evaluating arguments and inferences. The presentation of basic logic ideas through several logical problems from the writings of Raymond Smullyan and Martin Gardner is what makes this course distinctive.

§2. Syllabus. Basic concepts, Formal and Informal Fallacies, Aristotelian Logic and its limitations, Origins of modern Logic (Boolean logic), Propositional and predicate Logic(Validity, consistency, soundness, proof, completeness) and various techniques such as *Truth Table method, Indirect truth table method, Natural Deduction, Tree Method, Paradoxes*

§3. Reading material.

- Patrick Hurley A Concise Introduction to Logic, Wardsworth, 2007 [Standard Course Book]
- Elliot Mendelson Introduction to Mathematical Logic, pp: 1-90 [Propositional and Predicate Logic]
- Shawn Hedman, A first course in Mathematical Logic, oxford university press, pp 1-115[Extra]
- Bertrand Russell and A. N. Whitehead, Principia Mathematica, 1910, pp. 89-135
- Raymond Smullyan, Forever Undecided: A Puzzle Guide to Gödel, 1987
- Martin Gardner, aha! Insight aha! Gotcha.The mathematical association of America, 2002.
- Lewis Carroll, Symbolic Logic, available in the Link: http://www.lewiscarroll.org/texts.html
- Stephen Read, Thinking about Logic: An Introduction to the Philosophy of Logic, Oxford University Press.
- Graham Priest, Logic: A Very Short Introduction, Oxford University Press, 2001.

§4. Structure of the course. The structure of the course is as follows: The course is divided into three parts. In the first part, the student is introduced with the basic concepts and various fallacies (formal and informal.). Second part deals with the origin of Modern Logic and the concepts of propositional logic. The third part deals with theorems and techniques (decision procedures) which are important in Propositional calculus and predicate logic.

§5. Evaluation. The weightage in terms of percentage is as follows:

- Mid semester (30%)
- Quizzes/Assignments (30%).
- End Semester Exam (40%)

§6. Interesting web Links.

- http://groups.google.com/group/sci.logic/topics [Sci.Logic].
- http://www.cs.nyu.edu/pipermail/fom/ [Foundations of Mathematics[FOM]]
- http://world.logic.at/ [Logic Around the World]
- http://groups.google.com/group/sci.mathl [Sci.Math]
- http://sakharov.net/foundation.html [Topics in Logic[best site]]
- http://plato.stanford.edu/ Stanford Encyclopedia of Philosophy]

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