TRIBHUVAN UNIVERSITY
INSTITUTE OF SCIENCE AND TECHNOLOGY
SCHOOL OF MATHEMATICAL SCIENCES
Bachelor in Mathematical Sciences (B.Math.Sc.)

Course of Study

Code No.: MSMT 203　　　　　　　　　　　　　　　　　　　　　*Full Mark*: 75
Paper:　**General Logic**　　　　　　　　　　　　　　　　　　　*Pass Mark*: 30
Nature: Theory and Lab Work　　　　　　　　　　　　　　　　*Credit*: 3

Course description:

Logic is concerned with good reasoning; as such, it stands at the core of the science. This course will discuss the forms and functions of language, theories of deductive logic, and inductive methods. The course will emphasize on the skills of understanding complex materials by analyzing their logical structures, and the skills of constructing clear and convincing arguments by following the basic logical principles. A computer program will be used in the course to help students to grasp the skills of logical analysis.

Course objectives:

Students will

- Acquire knowledge of the principles of correct reasoning
- Gain practice in exploring the questions, methods and approaches of the discipline of logic,
- Acquire the abilities to recognize, analyze, and criticize arguments in the contexts of reading, writing, thinking, and discussion.
- Acquire skill in emphasize balanced argument and critical thought.

*Mode of Delivery***:**

The course will be taught by lecture (48 hrs), and problem solving and class discussion (24 hrs). The use of computer lab for problem solving will be encouraged.

*Course content***:**

Unit 1 Language　　　　　　　　　　　　　　　　　　　　　　　　　9 hrs
Introduction, Arguments, Definition, Fallacies.
Computer Lab *LogicCoach*: Analyzing arguments, Definitions.

Unit 2 Categorical Logic　　　　　　　　　　　　　　　　　　　　10 hrs
Categorical Statements, Venn Diagram, Translating Ordinary Language, Categorical Syllogisms, Arguments in Ordinary Language, Incomplete and Chain Arguments.
Computer Lab *LogicCoach*: Venn diagrams, Translating categorical statements.

Unit 3 Propositional Logic　　　　　　　　　　　　　　　　　　　10 hrs
The Connectives in Propositional Logic, Truth Tables, Indirect Truth Tables, Truth Trees.
Computer Lab *LogicCoach*: Propositional logic, Truth tables.

Unit 4 Natural Deduction　　　　　　　　　　　　　　　　　　　　10 hrs
The Rules of Inference, The Rules of Replacement, Strategies, Conditional Proofs, Indirect Proofs.
Computer Lab *LogicCoach*: Inference rules, Replacement rules, Conditional proofs.

Unit 5 Induction and Other Applications 9 hrs

Inductive generalization, Hypothetical reasoning.

Textbook:

Patrick J. Hurley, *A Concise Introduction to Logic*, 12th Edition. Wadsworth Publishing Company, 2015.

Software: *LogicCoach 11.0*, Cengage Learning, Inc.
http://en.freedownloadmanager.org/Windows-PC/LogicCoach-FREE.html

Reference books:

1. Irving M. Copi, and Carl Cohen and Kenneth McMahon, *Introduction to logic*. 14th ed. Pearson International edition, 2014.
2. Harry J. Gensler, *Introduction to logic*, Routledge, New York, 2010.

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