S.Y.B.A.

Logic and Principles of Reasoning

General – Paper II

[**Objective:** To acquaint the student with the principles and techniques of Axiomatic System, Predicate Calculus, Relational Logic and Identity.]
The approximate duration of teaching of each unit is 12 lectures

First Term

Unit 1:

1. Nature of systematization and its limits Axiomatic system, Logistic system, concept of syntax and semantics, significance of Logical Syntax
2. Elements of deductive system, Characteristics of a deductive system
3. Axiomatic System of P.M. and its first 15 theorems

Unit 2:

1. Need for Predicate Logic, difference in approach between Traditional logic and Predicate Logic
2. Singular and General Propositions, Constants and Variables (Individual and Predicate) Propositional functions and Substitution instances; Instantiation and Quantification.
3. Universal and existential quantifiers; symbolizing general propositions; Evaluation of the square of opposition of traditional logic; Exercises in symbolizing general propositions.

Unit 3:

1. Need for quantification rules
2. Nature, form and use of Quantification rules (Preliminary version), Rule of quantificational negation (Q.N.)
3. Proving the validity of arguments involving quantification rule (preliminary version).

Unit 4:

1. The basis for demonstration of invalidity of arguments
2. Method of demonstrating invalidity of arguments in Predicate logic
3. Exercises in demonstrating invalidity of arguments in predicate logic

Second Term

Unit 5

1. The nature and definition of multiply general propositions
2. Exercises in symbolizing multiply general propositions.

Unit 6

1. Need for revising the preliminary quantification rules; Revised form of quantification rules
2. Exercises pertaining to erroneous proofs
3. Exercises in proving the validity of arguments involving the use of revised Quantification rules, proof of logical truths involving quantifiers

Unit 7

1. Predicates and relations; Relational Logic as an extension of Predicate logic.
2. The logical structure of relational proposition; kinds of relational propositions according to the number of relata.
3. Symbolizing relational propositions
4. Proving validity of arguments involving relational propositions

Unit 8

1. Properties of dyadic relations
2. Enthymeme. Proving validity of relational enthymemic arguments.
3. Study of identity as a relation, Exercises in symbolizing propositions involving the relation of Identity, Rules of Identity, proving validity of arguments involving identity

Books for Study

1. Copi, I. M., *Introduction to Logic*, Macmillan Co. New York, 1986.
2. Copi, I. M., *Symbolic Logic,* Macmillan Co. New York, 1995 (6^{th} ed.).
3. Hughes and Londe, Elements *of Formal Logic,*Methuen, London, 1965. *(Relevant chapters only)*
4. Terrell, D.B., *Logic : A Modern Introduction to Ded*uctive *Reasoning*, Holt Reinhart and Winston, New York, 1967.