SECOND SEMESTER, 2020-2021

Course Handout (Part II)

Date: 18-01-2021

In addition to part I (General course Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

***Course No.*:** **HSS F236**
***Course title*:** **Symbolic Logic**
***Instructor-in-charge*:** **ANUPAM YADAV**

Scope and Objective:

A study of the propositional and quantification logic to understand and use the basic symbolic procedures to analyze the nature and assess the status of deductive arguments

Text Book: Copi, Irving M., *Symbolic Logic*, 5th Edition, Pearson Education, 1979 (Indian Reprint, 2014)

Reference Books:
R1. Carney, J.D, *Introduction to Symbolic Logic*, Englewood Cliffs, N.J., 1970
R2. Copi, Irving M, *Introduction to Logic*, Pearson Education, 13th Edition, 2009

Course Plan:

Module No.	Lecture Session	Reference	Learning Outcomes
1. Introduction to logic: the nature of logical reasoning, the structure and soundness of arguments.	L 1.1.-1.4 1.1 Subject matter of logic 1.2 Logical reasoning and Key concepts 1.3 Representing the structure of arguments 1.4 Relation between truth, validity and soundness of arguments.	R2, Ch. 1 R2, Ch. 1 R2, Ch. 1 TB, Ch. 1	Understanding the nature of inferential reasoning, types of reasoning. Learning major vocabulary, analyzing the nature of arguments and the relation between truth and validity.
2. Traditional Aristotelian Logic – Categorical propositions, their relations,	L 2.1 – 2.6 2.1. Nature of Categorical	R2, Ch.5	Understanding the nature of categorical propositions, their divisions and relations

Syllogistic reasoning, rules, fallacies and testing syllogisms by Venn diagram.	propositions, quantity and quality. 2.2. Distribution of terms and its importance in syllogism 2.3. Square of opposition and inferences. 2.4 Categorical Syllogism, rules, fallacies and validity of syllogisms. 2.5. Venn diagram 2.6 Testing syllogisms by using Venn diagrams.	R2, Ch.5 R2, Ch.6 R2, Ch.6	of opposition. Understanding syllogistic reasoning and validity of syllogisms in accordance with rules. Knowing the usage of Venn technique to test syllogisms.
3. Introduction to Symbolic Logic and its concerns, symbolic representation of natural language and arguments containing compound statements.	L 3.1 – 3.6 3.1 The nature of symbolic logic and its concerns 3.2 symbolizing natural language, simple and compound statements 3.3 - 3.5 Truth-functional connectives: conjunction, disjunction, negation, material implication and bi-conditional 3.6 Truth-values of compound statements	TB, Ch. 1 TB, Ch. 2 TB, Ch. 2 TB, Ch. 2	Understanding the importance of symbolic logic and symbolic representation of natural language to find out the logical features, learning to compose compound statements and arguments, analyzing the nature of truth-functional compound statements and determining their truth-values.
4 The role of truth-functional logic, constructing truth-tables, determining the validity and invalidity of arguments. Argument forms, statement forms and determining the logical status of the statements.	L 4.1 - 4.6 4.1 – 4.2 constructing truth-tables and checking the validity of arguments mechanically 4.3 argument forms to identify the formal features and checking their validity 4.4 – 4.5 Statement forms: their formal nature and classification as tautologies, contradictories and contingent. 4.6 testing the logical status of statement forms.	TB, Ch. 2	To use truth-table method to test the validity-invalidity of arguments, understanding the formal nature of arguments and statements, their classification and determining the logical status of statement forms.

5. Formal proof of validity, Rules of Inference, Rules of Replacement, Conditional proof and proving Invalidity	L 5.1 – 5.6 5.1 – 5.2 formal proof of validity: Elementary Valid argument forms, determining the validity of arguments 5.3-5.4 Rules of Replacement and using them to prove the validity of arguments 5.5 Conditional Proof 5.6 Proving Invalidity	TB, Ch. 3 TB, Ch. 3 TB, Ch. 3	Understanding the rules of Inference and rules of replacement and applying them to prove the validity of the arguments, to use conditional proof as a tool to check the validity of the arguments. Also proving the invalidity of without using truth tables and formal proofs.
6. Indirect method of proof (*reductio ad absurdum*) and Shorter Truth Table Method to check validity of arguments and the status of the statements	L 6.1 – 6.3 6.1 Indirect proof 6.2 – 6.3 Shorter Truth Table Method to check the validity and the truth status of the statements	TB, Ch. 3	Understanding to employ *reduction ad absurdum* as method to assess the validity of the arguments and the status of the statements drawing insights from truth table technique.
7. Quantification Theory, Relation between propositional and predicate logic, Universal and existential quantifiers, Modern square of opposition	L 7.1 – 7.4 7.1- 7.2 Quantification theory and symbolization 7.3 Quantifiers: Universal and Existential 7.4 Modern Square of opposition	TB, Ch. 4	Understanding how to symbolize statements that involve quantifiers, knowing the nature and function of quantifiers, the relation between propositions involving quantifiers according to the square of opposition and comparing it with the traditional square of opposition.
8. Quantification Rules, proving Validity and Invalidity of the arguments	L 8.1 – 8.4 8.1 – 8.2 Quantification Rules 8.3 Proving Validity by using these additional rules 8.4 Proving Invalidity by assigning	TB, Ch. 4	Understanding the nature of quantification rules and applying them to prove arguments involving quantifiers. Knowing to prove the invalidity of

	truth-values		certain arguments by assigning truth-values.
9. Symbolizing Relations and Attributes of binary relations	L 9.1 – 9.2 9.1 Symbolizing relations 9.2 Attributes of Binary relations	TB, Ch. 5	Understanding how to symbolize the statements involving relations and check the attributes of relational statements.

Upon completion of the course students will have

- A clear understanding of the nature of logical reasoning and its correctness
- The knowledge of determining the validity of the arguments by using various laws and tools
- The knowledge of traditional Aristotelian logic and advancements in deductive logic through modern symbolic logic
- An understanding about the importance of symbols and symbolization to carry out deductive reasoning and the relevance of logic to other disciplines.

Evaluation Scheme:

EC No.	Evaluation Component	Duration	Weightage/ Marks	Date, Time & Venue	Remarks
1	Mid Semester Test	90 Minutes	30	To be announced	OB
2	Report / Assignment/Presentation Quiz	-	30	To be announced	OB/CB
3	Comprehensive Examination	120 Minutes	40	15/05/2021 FN	OB

Chamber Consultation Hour: To be announced in the class.

Makeup Policy: Make-up components will be allowed provided there would be a documentary proof to support the case.

Instructor-in-charge
HSS F236