Yukti Prasarana Kendram
Sri Chandrasekharendra Saraswathi Viswa
Mahavidyalaya
Kanchipuram, Tamil Nadu

COURSE TITLE:

COURSE ON MATHEMATICAL AND COMPUTER LOGIC

FOR NYAYA SASTRA STUDENTS

Focus Area/Subject Area: Indian Mathematics

Eligibility: Any Undergraduate/Post Graduate Student

Details of the Instructor:

1. Dr.K.Srinivasa Rao, Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya
2. Dr. A. Gayathri

Course Duration: 33 Hrs

Course Objective:

The course "Mathematical and Computer Logic in Nyaya Sastra Students" aims to provide UG/PG students of Nyaya Sastra and teachers with a comprehensive understanding of applying mathematical and computer logic to analyze and reason about NyayaSastra texts. Participants will learn core concepts of propositional and predicate logic, utilize computational tools, explore modal logic, and engage in a comparative study of Nyaya Sastra with Western philosophical logic. Emphasis is on enhancing critical thinking, and problem-solving abilities, and fostering ethical research practices. The course empowers students and teachers to contribute to the field through innovative research and logical analysis, bridging ancient wisdom with modern logic.

Learning Outcome:

1. Understand the fundamentals of mathematical logic and its relevance to Nyaya Shastra.Apply propositional and predicate logic to analyze Nyaya Sastra's arguments.
2. Utilize computer logic principles, including Boolean algebra and logic gates, for Nyaya Shastra methodologies.
3. Demonstrate proficiency in formal reasoning, modal logic, and logical fallacy detection within Nyaya Shastra texts.
4. Gain practical skills in using computational tools for logical analysis and apply them to solve Nyaya Shastra problems

SYLLABUS

Module 1: Introduction to Mathematical Logic (5 Hours)

- Overview of Nyaya Shastra and its relevance in the modern context (1 hour)
- Propositional Logic: Syntax, semantics, and truth tables - Predicate Logic (1 hour)
- Quantifiers, variables, and logical connectives (1 hour)
- Inference Rules and Proofs in Mathematical Logic (2 hours)

Module 2: Foundations of Computer Logic (4 Hours)

- Introduction to Computer Logic: Boolean Algebra and Logic Gates (2 hours)
- Combinational Circuits and their applications in Nyaya Shastra (1 hour)
- Sequential Circuits and their relevance in Nyaya Shastra methodologies (1 hour)

Module 3: Nyaya Shastra and Logical Reasoning (5 Hours)

- Overview of Nyaya Shastra principles and methodologies (1 hour)
- Formal analysis of Nyaya Shastra syllogisms and reasoning (1 hour)
- Logical fallacies and error detection in Nyaya Shastra texts (1 hour)
- Symbolic representation and analysis of Nyaya Shastra arguments (2 hours)

Module 4: Modal Logic in Nyaya Shastra (5 Hours)

- Modal operators: Possibility, necessity, and contingency in Nyaya Shastra (2 hours)
- Application of Modal Logic in analyzing Nyaya Shastra concepts (1 hour)
- Formal representation of Nyaya Shastra modal arguments (2 hours)

Module 5: Computational Tools for Nyaya Shastra Analysis (4 Hours)

- Introduction to computational tools for logical analysis (1 hour)
- Utilizing software and programming languages for Nyaya Shastra reasoning (2 hours)
- Case studies and practical exercises using computational tools (1 hour)

Module 6: Integration with Modern Logical Systems (5 Hours)

- Comparative study of Nyaya Shastra with Western philosophical logic (1 hour)
- Examining the intersections and divergences between Nyaya Shastra and contemporary logic (2 hours)
- Contemporary applications of Nyaya Shastra principles in logical analysis (2 hours)

Module 7: Case Studies and Practical Exercises (5 Hours)

- Analyzing selected Nyaya Shastra texts and arguments using mathematical and computer logic (2 hours)
- Solving logical puzzles and problems from Nyaya Shastra (1 hour)

- Critical thinking and problem-solving exercises based on Nyaya Shastra principles (2 hours)

References/ Learning Resources:

1. न्यायसूत्रम्, वात्स्यायनभाष्यसहहतम्– महर्षिगौतम:, वात्स्यायनश्च.
2. तत्त्वहिन्तामणौपराथानुमानप्रकरणम्– गंगेशोपाध्याय:
3. Mathematical Logic by Stephen Cole Kleene
4. Introduction to Logic by Irving M. Copi and Carl Cohen
5. A Concise Introduction to Mathematical Logic by Wolfgang Rautenberg
6. Logic in Computer Science: Modelling and Reasoning about Systems by Michael Huth and Mark Ryan
7. Computability and Logic by George S. Boolos, John P. Burgess, and Richard C. Jeffrey
8. Mathematical Logic for Computer Science by Mordechai Ben-Ari
9. Handbook of Practical Logic and Automated Reasoning by John Harrison