**Vivekanand Education Society’s Institute of Technology**

**Department of Artificial Intelligence and Data Science **

**Year: 2022-2023 (ODD)**

**Name of the Course :**  Artificial Intelligence Laboratory

**Year/Sem/Class :** T.E. (AI&DS) / Sem V / D11AD **Code:** CSL503

**Faculty In charge :** Dr. Anjali Yeole **Lab Incharge:** Dr. Anjali Yeole

**Email :** anjali.yeole@ves.ac.in

1. **Program Outcomes (PO):**

**PO1) Engineering knowledge:** Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2) Problem Analysis:** identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3) Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, and the cultural, societal, and environmental considerations.

**PO4) Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5) Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6) The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7) Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8) Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9) Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10) Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11) Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12) Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

1. **Programme Specific Outcomes (PSOs)**

**PSO1) Professional Skills:** Understand, analyze and develop essential proficiency in the areas related to artificial intelligence and data science like mathematics, computational methods and statistics.

**PSO2) Successful Career:** Ability to design and implement novel solutions using state of the art Artificial Intelligence and Data Science techniques such as Machine Learning, Reinforcement and Deep Learning, Natural Language Processing leading to successful careers.

1. **Programme Educational Objectives (PEOs)**

**PEO1:** To inculcate the fundamentals of science and engineering concepts essential for solving real world problems in the field of Artificial Intelligence and Data Science.

**PEO2:** To empower students with knowledge and expertise to accomplish Socially Innovative Project with ethical practices in the area of Artificial Intelligence and Data Science.

**PEO3:** To enable graduates to participate in lifelong learning, innovative research and product development in the area of Artificial Intelligence and Data Science

**D) Lab Outcomes:**

| **CSC503.1** | Identify suitable Agent Architecture for a given real world AI problem |
| --- | --- |
| **CSC503.2** | Implement simple programs using Prolog |
| **CSC503.3** | Implement various search techniques for a Problem-Solving Agent |
| **CSC503.4** | Represent natural language description as statements in Logic and apply inference rules to it |
| **CSC503.5** | Construct a Bayesian Belief Network for a given problem and draw probabilistic inferences from it |

**E) Grading for Credit Based Grading System (CBSGS)**

| **Sr. No.** | **Range** | **Grade** | **Grade Point** |
| --- | --- | --- | --- |
| 1 | 80 and above | Outstanding (O) | 10 |
| 2 | 75.00 – 79.99 | Excellent (A) | 9 |
| 3 | 70.00 – 74.99 | Very Good (B) | 8 |
| 4 | 60.00 – 69.99 | Good (C) | 7 |
| 5 | 50.00 – 59.99 | Fair (D) | 6 |
| 6 | 45.00 – 49.99 | Average (E) | 5 |
| 7 | 40.00 – 44.99 | Pass (P) | 4 |
| 8 | Less than 40.00 | Fail (F) | 0 |

**Vivekanand Education Society’s Institute of Technology**

**Department of AI and Data Science ,(2022-23)**

**Name of the Course:** AI Lab  **Year/Sem/Class:** T.E.(AI and DS) / Sem V / D11AD

**Index**

| **SN** | **Lab Experiments** | **LO** | **DOP** | **DOS** | **Grade** |
| --- | --- | --- | --- | --- | --- |
| 1 | Provide the PEAS description and TASK Environment for a given AI problem , Identify suitable Agent Architecture for the problem | LO1 |  |  |  |
| 2 | Write simple programs using PROLOG as an AI programming Language : family tree | LO2 |  |  |  |
| 3 | Write simple programs using PROLOG as an AI programming Language : tower of hanoi | LO2 |  |  |  |
| 4 | Formulate the Problem Statement for the AI System | LO1 |  |  |  |
| 5 | Implement any one Uninformed Search (DFS/BFS) for 4 queen/8 queen/8 puzzle or any state space | LO3 |  |  |  |
| 6 | Implement any one of the Informed search techniques E.g. A-Star algorithm for 8 puzzle problem/ TSP | LO3 |  |  |  |
| 7 | Implement any one of the Local Search techniques. E.g. Hill Climbing, Simulated Annealing, Genetic algorithm for 4 queen | LO3 |  |  |  |
| 8 | Prove the goal sentence from the following set of statements in FOPL by applying forward, backward and resolution inference algorithms. wampus/ resolution graph | LO4 |  |  |  |
| 9 | Create a Bayesian Network for the given Problem Statement and draw inferences from it. (You can use any Belief and Decision Networks Tool for modeling Bayesian Networks) | LO5 |  |  |  |
| 10 | Case study of any existing successful AI system | LO1 -LO5 |  |  |  |
|  | **Assignments** |  |  |  |  |
| 1 | Assignment 1 |  |  |  |  |
| 2 | Assignment 2 |  |  |  |  |
|  | **Test** |  |  |  |  |
| 1 | Test 1 |  |  |  |  |
| 2 | Test 2 |  |  |  |  |
|  | **Quiz** |  |  |  |  |
|  | **Overall Grade** |  | | | |

**SIGNATURE OF FACULTY**