To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problemsolving skills through emerging technologies**.**

**Session 2025-2026**

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| **Vision:** Dream of where you want. | **Mission:** Means to achieve Vision |

**Program Educational Objectives of the program (PEO):** (broad statements that describe the professional and career accomplishments)

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| PEO1 | **Preparation** | **P: Preparation** | **Pep-CL abbreviation pronounce as Pep-si-lL easy to recall** |
| PEO2 | **Core Competence** | **E: Environment**  **(Learning Environment)** |
| PEO3 | **Breadth** | **P: Professionalism** |
| PEO4 | **Professionalism** | **C: Core Competence** |
| PEO5 | **Learning**  **Environment** | **L: Breadth (Learning in diverse areas)** |

**Program Outcomes (PO):** (statements that describe what a student should be able to do and know by the end of a program)

**Keywords of POs:**

Engineering knowledge, Problem analysis, Design/development of solutions, Conduct Investigations of Complex Problems, Engineering Tool Usage, The Engineer and The World, Ethics, Individual and Collaborative Team work, Communication, Project Management and Finance, Life-Long Learning

**PSO Keywords:** Cutting edge technologies, Research

“I am an engineer, and I know how to apply engineering knowledge to investigate, analyse and design solutions to complex problems using tools for entire world following all ethics in a collaborative way with proper management skills throughout my life.” to contribute to the development of cutting-edge technologies and Research.

**Integrity:** I will adhere to the Laboratory Code of Conduct and ethics in its entirety.

Sanskruti. Paunikar 02/09/2025

**Name and Signature of Student and Date**

(Signature and Date in Handwritten)

# Mission of the Department

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| **Session** | 2025-26 (ODD) | **Course Name** | High Performance Computing Lab |
| **Semester** | 7 AIDS | **Course Code** | 22ADS702 |
| **Roll No** | 24 | **Name of Student** | Shreya Kudmethi |

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| Practical Number | 5 |
| Course Outcome | **CO1:-**Understand and Apply Parallel Programming Concepts **CO1:-**Analyze and Improve Program Performance.  **CO3:-**Demonstrate Practical Skills in HPC Tools and Environments. |
| Aim | Basics of MPI Programming |
| Theory  (100 words) | Message Passing Interface (MPI) is a standardized library employed for parallel programming on distributed memory architectures. It allows several processes on distinct nodes to exchange and synchronize information by passing messages. MPI is extensively applied in HighPerformance Computing (HPC) to address large-scale computational issues. Programs are authored in C, C++, or Fortran, compiled by mpicc, and run with mpirun or mpiexec. Fundamental operations are MPI\_Init,  MPI\_Comm\_size, MPI\_Comm\_rank, MPI\_Send, MPI\_Recv, and MPI\_Finalize. MPI ensures scalability, portability, and optimized communication for parallel processes on Linux clusters. |
| Procedure and Execution  (100 Words) | Steps of Implementation:-   1. **Install MPI library** (e.g., OpenMPI or MPICH) on Linux. 2. **Write MPI program** in C/C++ using functions like MPI\_Init, MPI\_Comm\_rank, and MPI\_Send/Recv. 3. **Compile** using mpicc program.c -o program. 4. **Run** with multiple processes: mpirun -np 4 ./program. 5. **Observe outputs** from each process (rank IDs) |
| Code: sudo apt-get install openmpi-bin openmpi-common libopenmpi-dev brew install open-mpi mpicc hello.c -o hello mpirun -np 4 ./hello mpirun -np 4 ./program\_name |

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|  | Output: |

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To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration. **Mission of the Department**

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# Vision of the Department

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| Output Analysis | When executed with multiple processes, each process prints its rank and the total number of processes. Communication via MPI\_Send and MPI\_Recv demonstrates message passing between processes. The output confirms correct distribution of tasks across processes, proving parallel execution on Linux. |
| Github link |  |
| Conclusion | MPI allows efficient communication between processes for parallel programming.  It provides scalability and portability for distributed computing on Linux systems.. |

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Department of Artificial Intelligence & Data Science

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| Date | 02/09/2025 |