701 HPC Course Project - Guidelines

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Outline

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Course Project

- Students are required to complete a course project as part of their lab exercises, focusing on a specific research topic within the field of High Performance Computing (HPC).
- The selected research topic must be thoroughly examined, including understanding the relevant domain, reviewing past studies, and identifying existing research gaps.
- Upon identifying the specific problem, students must propose potential solutions.
- The proposed solution should be implemented using the ACCESS NOXIM simulator, with results systematically obtained and analyzed.
- Comprehensive documentation must be maintained during each phase of the project without exception.
- Finally, students are expected to submit a research journal paper as proof of their work.

Outline

General Guidelines

- Students will be organized into 18 groups, each consisting of two members, and mentors will be assigned to each group.
- Students are required to maintain regular communication with their mentors to ensure the smooth progress of their work.
- A reference paper will be provided to each group, which they must thoroughly study to identify a minimum of 10 related papers (per head at least 5 papers).
- These related papers must be preferably journal papers from the IEEE, ACM, Elsevier, or Springer databases.
- Additionally, they should be relevant and published within the past 3 years.
- As their final course project report, each group is expected to submit a collaborative journal paper that includes a concise literature review and a proposed methodology.

- Group members should carefully analyze the related papers and create a spreadsheet that highlights specific details, such as **serial number**, **title**, **author(s)**, **year of publication**, **objectives**, **methodology**, **evaluation**, **results**, and **limitations**.

Sl No.	Title	Authors	Year	Objectives	Methodology	Evaluation	Results	Limitations
1	High Performance Computing in Big Data Analytics: Challenges and Solutions	John Doe, Jane Smith, Alan Turing	2021	Explore challenges of applying HPC in real-time big data analytics and propose a framework to improve processing efficiency.	Hybrid model combining MapReduce with parallel computing frameworks; used simulation models and real-world data for testing.	Benchmarked against existing systems; metrics included processing time, scalability, and resource utilization.	30% improvement in processing time over traditional methods; enhanced scalability across various scenarios.	Reliance on simulated data; performance in real-world environments with diverse data types not fully assessed.

Table 1: Summary of Research Papers in High Performance Computing

General Guidelines

- Following the review of the related papers, group members are instructed to prepare **Phase 1** of the journal paper.
- Phase1 should contain the related work section, including a summarized table highlighting past studies.
- After submitting Phase 1 of the journal paper, a presentation will be scheduled.
- After the presentation, group members should begin implementing the proposed methodology.

General Guidelines

- The work should be implemented using ACCESS NOXIM NoC Simulator and the results should be recorded.
- Students should ensure that the work implemented should be of utmost quality, scalable to higher network and traffic sizes, and adaptable by different routing algorithms.
- Subsequently, **Phase 2** of the journal paper commences, where group members must align their work accordingly.
- Phase 2 should contain the corrected Phase 1, along with proposed methodology.
- The proposed methodology should contain the working principles, required flow charts, algorithms(pseudocode), etc.
- Following Phase 2, group members will present their work.

General Guidelines

- The **Phase 3** should contain the corrected Phase 2, along with Experimental Results.
- Implementation along with required performance evaluation should be completed.
- Subsequently, **Phase 4** should contain corrected Phase 3, along with Extended Experiments.
- The extended experiment should contain the Scalability, and Adaptability.
- The **Phase 5** should contain the corrected Phase 4, along with Abstract, Introduction, and final Conclusion sections of the journal paper.
- Following Phase 5, final documentation should be submitted.
- A final presentation should be given following Phase 5

Outline

Points to Remember

- Maintain proper communication with the mentors.
- Attendance is mandatory.
- All activities related to the course project should be conducted during the designated lab hours.
- All required software and applicable simulators should be installed on the lab machines assigned to group members.
- Research paper should be prepared in Latex only.
- Strictly meet the deadlines.
- Plagiarized works will not be considered for evaluation.

Outline

Tentative Timeline

Table 2: Project Phases, Works, and Tentative Deadlines

Phases	**Works**	**Tentative Deadlines**
Phase 0	Hands-on experimentation using simulator	1st week of September, 2024
Phase 1	Literature Review and Problem Identification	30 September, 2024
Phase 2	Proposed Methodology (Documentation)	1st week of October, 2024
	Proposed Methodology (Presentation)	2nd week of October, 2024
Phase 3	Experimental Results	31st October, 2024
Phase 4	Scalability, Adaptability	1st week of November, 2024
Phase 5	Final Submission and Presentation	2nd week of November, 2024

Thank You!