NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA SURATHKAL
COURSE PLAN AND THE EVALUATION PLAN

1. Course Code : MA721
2. Course Title : Introduction to Scalable Systems
3. (L-T-P) Credits : (3-0-0) 3
4. Prerequisite : -Nil-
5. Course Instructor : Dr. Pushparaj Shetty D.
6. Teaching Department : M.A.C.S
7. Objectives of the course

- To understand core of Parallel programming concepts.
- To realize the parallel program implementation on various platforms
- To map the theoretical concepts to advances in hardware
- To demonstrate the multiprocessor programming taking appropriate applications.
- To demonstrate GPU computing through CUDA programming for an application.

8. Skill development of the student expected from the course

- To identify the potential parallel components in an application
- Proficiency in Open MP and MPI programming
- Proficiency in CUDA programming

9. Course Coverage (40 Lecture Schedule):

Sl.No.	Contents	Approx. No. of lecture hours
1	Computer organization, Memory hierarchy, cache memory,	6
2	Parallelization Principles: motivation, challenges, metrics, parallelization steps, data distribution, PRAM model; concurrent data structures, and cloud computing systems.	8
3	Parallel Programming Models and Languages: OpenMP	8
4	Parallel Programming Models and Languages: MPI Programming	6
5	GPU computing and CUDA programming	6
6	Distributed Computing: Commodity cluster and cloud computing; Distributed Programming: MapReduce/Hadoop model.	6

10. References:

- An Introduction to Parallel Programming. Peter S Pacheco. Publisher: Morgan Kauffman. ISBN: 978-93-80931-75-3. 2011.
- Parallel Computing Architecture. A Hardware/Software Approach. David Culler,

Jaswant Singh. Publisher: Morgan Kauffman. ISBN: 981-4033-103. 1999.
- Parallel Computing. Theory and Practice. Michael J. Quinn. Publisher: Tata: McGraw-Hill. ISBN: 0-07-049546-7. 2002.
- Computer Systems – A Programmer's Perspective. Bryant and O'Hallaron. Publisher: Pearson Education. ISBN: 81-297-0026-3. 2003.
- Introduction to Parallel Computing. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar. Publisher: Addison Wesley. ISBN: 0-201-64865-2. 2003.
- Online references for OpenMP, MPI and CUDA
- Google colab online referece

11. Evaluation Plan:

1. Mid Semester Examination : 20%
2. Quiz 1 : 10%
3. Quiz2 : 10%
4. ProgrammingAssignment 1 : 15%
5. Programming Assignment2 : 15%
6. End semester Examination : 30%

Pushparaj Shetty D.