



**SRI VIDYA COLLEGE OF
ENGINEERING & TECHNOLOGY
COURSE PLAN**

Doc.Ref:SV**CSE02**

Revision:03

Date: 23/10/18

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

ACADEMIC YEAR: 2018-2019

Subject Code	CS 6801			L	P	T	C					
Subject Title	Multicore Architecture and Programming			3	0	0	3					
Year / Dept / Sem	IV / CSE / VIII		Regulation Year	2013								
Faculty Name / Desg / Dept	S.Sujitha/ Assistant Professor / CSE											
Course Prerequisite	Basic Networks											
Course Objectives (CO)	CO1: Understand the challenges in parallel and multi-threaded programming. CO2: Learn about the various parallel programming paradigms, and solutions. CO3: To learn how to run parallel programs with OpenMP and MPI CO4: To understand the issues in the real time programming of parallel architecture.											
Mapping of CO & PO(Specify the PO's)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	B,2	-	C,3		-	-	-	-	-	-	-	-
CO2	-	-	-	B,2	A,2	-	G,2	-	G,1	-	-	-
CO3	-	B,2	E,2	C,1	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	H,1
CO6	-	-	-	-	-	F,1	-	-	-	-	-	-
Related Video Course Materials (min. 4 no.s)	V1: https://www.youtube.com/watch?v=crZwPhNjNiU V2: https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-189-multicore-programming-primer-january-iap-2007/lecture-notes-and-video/13-introduction-to-parallel-architectures/ V3: https://www.youtube.com/watch?v=EIblYHNNhJPM V4: https://www.youtube.com/watch?v=SgujaIzkwrE											
Related Website URLs	W1: www.nptel.com W2: www.youtube.com W3: www.slideshare.net W4: www.asat.edu											
Expected Course Outcome (ECO)	At the end of the course, the students should be able to: ECO1 : Program Parallel Processors. ECO2 : Develop programs using OpenMP and MPI. ECO3 : Compare and contrast programming for serial processors and programming for parallel											
Bridging the Curriculum Gap (Additional Topics beyond syllabus / Seminars / Assignments)	BCG1: Bully election algorithm using multicore architecture BCG2: Lamport's clock in OpenMP BCG3: Cache oblivious algorithm in multicore architecture. BCG4: Adaptive Programming Model for Fault Tolerant Distributed Computing.											

S.No	Topic Name	Book	Page no	Mode of delivery	No of hrs	Cumulative hrs
UNIT I –Multi-Core Processors						
1	Introduction - Single core to Multi-core architectures	T1	4-12	BB	1	1
2	SIMD and MIMD systems	T1	29-35	BB	1	2
3	Interconnection networks	T1	35-42	BB	1	3
4	Symmetric and Distributed Shared Memory Architectures	T1	49-56	PPT	2	5
5	Cache coherence	T1	43-46	BB	1	6
6	Performance issues	notes	-	BB	1	7
7	Parallel program design	T1	65-70	PPT	1	8
8	Revision	-	-	-	1	9
UNIT II –Parallel Program Challenges						
1	Introduction to Parallel Programs	-	-	BB	1	10
2	Performance	T1	58-62	PPT	1	11
3	Scalability	T1	62-63	BB	1	12
4	Synchronization and data sharing – Data Races	T2	121-126	BB	1	13
5	Synchronization primitives (mutexes, locks, semaphores, barriers)	T2	126-131	BB	2	15
6	Deadlocks and livelocks	T2	132-133	PPT	1	16
7	Communication between threads (condition variables, signals, message queues and pipes).	T2	133-139	PPT	1	17
8	Revision	-	-	-	1	18
UNIT III– Shared Memory Programming With OpenMP						
1	Introduction	T1	209-210	BB	1	19
2	OpenMP Execution Model - Memory Model	T1	211-212	PPT	1	20
3	OpenMP Directives	T1	224-231	BB	1	21
4	Work-sharing Constructs- Library functions	T1	212-216	PPT	1	22
5	Handling Data and Functional Parallelism	T1	227-232	PPT	1	23
6	Handling Loops	T1	232-241	BB, PPT	2	25
7	Performance Considerations.	T1	318	BB,PPT	1	26
8	Revision	-	-	-	1	27
UNIT IV– Distributed Memory Programming With MPI						
1	Introduction	T1	83	BB	1	28
2	MPI program execution	T1	84-86	BB	1	29
3	MPI constructs - Libraries	T1	86-88	BB	1	30
4	MPI send and receive	T1	88-91	BB	2	32

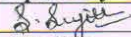
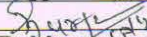
5	Point-to-point and Collective communication	T1	101-106	BB	1	33
6	MPI derived datatypes	T1	116-119	PPT	1	34
7	Performance evaluation	T1	119-126	PPT	1	35
8	Revision	-	-	-	1	36
UNIT V- Parallel Program Development						
1	Introduction to Parallel Program Development	T1	271	BB	1	37
2	Case studies	Notes	-	Board	1	38
3	n-Body solvers	T1	272-297	Board/PPT	2	40
4	Tree Search	T1	299-316	Board/PPT	2	42
5	OpenMP and MPI implementations and comparison	T1	316-327	PPT	2	44
6	Revision	-	-	-	1	45


TEXT BOOKS:

1. Peter S. Pacheco, "An Introduction to Parallel Programming", Morgan-Kaufman/Elsevier, 2011.
2. Darryl Gove, "Multicore Application Programming for Windows, Linux, and Oracle Solaris", Pearson, 2011 (unit 2)

REFERENCES:

1. Michael J Quinn, "Parallel programming in C with MPI and OpenMP", Tata McGraw Hill, 2003.
2. Shameem Akhter and Jason Roberts, "Multi-core Programming", Intel Press, 2006.

	<i>Prepared by</i>	<i>Approved by</i>
Signature		
Name	S.Sujitha	Dr.Murugeswari
Designation	Assistant Professor / CSE	Professor & HOD (Dept)
Signed date	23/10/18	

/ Endorsed /

 / Pcd /