

**IV/IV B. TECH. SECOND SEMESTER
PARALLEL COMPUTING (Elective- III)**

Course Code: CS 8T2B**Credits: 3****Lecture: 3 periods/ week****Internal assessment: 30 Marks****Tutorial: 1period/week****Semester end examination: 70 Marks**

Prerequisites: C programming language, Data structures and algorithms.

Course Objectives:

1. To understand the concepts Parallel Computers, Data and Temporal Parallelism.
2. To learn Structures of Parallel Computers.
3. To understand the concepts of Operating Systems for Parallel Computers.
4. To acquire knowledge on CUDA.
5. To learn Parallel Programming with CUDA C.

Course Outcomes:

At the end of this course student will:

CO1) Solve the Problems in Parallel

CO2) Have knowledge on Different Structures of Parallel Computers

CO3) Understand the Performance Evaluation of Parallel Computers

CO4) Get acquaintance on CUDA

CO5) Develop Parallel Programs In CUDA C

Syllabus:**UNIT 1****Introduction:**

Why do we Need High Speed Computing, How do we Increase the Speed of Computers , History of Parallel Computers.

Solving problems in parallel: Utilizing Temporal Parallelism , Utilizing Data Parallelism , Comparison of Temporal and Data Parallel Processing , Data Parallel Processing with Specialized Processors.

UNIT 2

Structure of parallel computers: A Generalized Structure of a Parallel Computer, Classification of Parallel Computers, Vector Computers, A Typical Vector Super Computer, Array Processors, Shared Memory Parallel Computers, Distributed Shared Memory Parallel Computers, Message Passing Parallel Computers.

UNIT 3

Operating systems for parallel computers: Resource Management , Process Management , Process Synchronization , Inter-process Communication , Memory Management , Input/output (Disk Arrays) , Basics of Performance Evaluation , Performance Measurement Tools.

UNIT 4

Computer unified device architecture: The age of parallel processing, The rise of GPU computing, CUDA, Applications of CUDA, Development Environment-CUDA Enabled Graphics Processors, NVIDIA Device driver, CUDA Development Tool kit, Standard C compiler.

UNIT 5**CUDA C:**

Introduction to CUDA C: First program, Querying Devices, Using Device Properties,
Parallel Programming in CUDA C: CUDA Parallel Programming- Summing Vectors program

Learning Resource**Text Books**

1. Parallel Computers Architecture and Programming, V. Rajaraman, C. Siva Ram Murthy, PHI.
2. CUDA By Example, Jason Sanders, Edward Kandrot, Addison_Wesley.

References

1. Introduction to Parallel Computing, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Pearson Education.
2. Parallel Computing Theory and Practice, Michel j.Quinn