



Visvesvaraya Technological University

"Jnana Sangama" Belagavi-590018, Karnataka State, India

Dr. A. S. Deshpande B.E., M.Tech., Ph.D.

Registrar

Phone: (0831) 2498100

Fax: (0831) 2405467

Ref: VTU/BGM/Academic/A-9/2020-21/ 2979

Dated: 12 OCT 2020

CIRCULAR

Subject: Bifurcated Module 02 and Module 03 of Subject PARALLEL COMPUTING (18MCA544) regarding...

Reference: Hon'ble Vice-Chancellor Approval Dated 12.10.2020

Concerning the subject cited above, the 2018 scheme MCA programme that uploaded on VTU web portal, in the subject **PARALLEL COMPUTING (18MCA544)** module 03 is merged with module 02. Module 02 has been bifurcated into Module 02 and Module 03 without modifying the content of the syllabus. The same is enclosed with this circular for information.

You are hereby informed to bring this to the notice of concerned. The bifurcated syllabus of PARALLEL COMPUTING (18MCA544) is made available for students and staffs concerned on the web portal of VTU at the following link- <https://vtu.ac.in/pdf/cbcs/pg/2018/mcaschsyll.pdf>

Encl: As mentioned above

Yours Sincerely



REGISTRAR



To,
The Principal of Constituent and Affiliated Engineering Colleges of VTU Belagavi

CC to

1. Hon'ble Vice-Chancellor through the secretary to VC for information
2. The Chairperson BOS in MCA for information
3. Special Officer, Academic Section for information

PARALLEL COMPUTING

Semester	V	CIE Marks	40
Course Code	18MCA544	SEE Marks	60
Contact Period (L:T:P)	3:0:0	Exam Hours	03

Credits : 03

Course Learning objectives: This Course(18MCA554) enable the students to:

- 1) Understand the need of parallel computing
- 2) Familiarize concepts of Distributed Memory Programming with MPI
- 3) Explore OpenMP and Parallel algorithms

Module 1

Introduction to Parallel Computing

Need of Performance, Building Parallel Systems, Why to Write Parallel Programs? How to Write Parallel Programs? Approach: Concurrent, Parallel, Distributed.

Parallel Hardware and Parallel Software

Background, Modifications to the von Neumann Model, Parallel Hardware, Parallel Software, Input and Output, Performance, Parallel Program Design and Writing and Running Parallel Programs

Module 2

Distributed Memory Programming with MPI

Getting Started, The Trapezoidal Rule in MPI, Dealing with I/O, Collective Communication, MPI Derived Data types, A Parallel Sorting Algorithm.

Module 3

Shared Memory Programming with Pthreads

Processes, Threads and Pthreads, Hello World program ,Matrix-Vector Multiplication, Critical Sections Busy-Waiting, Mutexes, Producer-Consumer Synchronization and Semaphores, Barriers and Condition Variables, Read-Write Locks, Caches, Cache Coherence, and False Sharing and Thread-Safety

Module 4

Shared Memory Programming with OpenMP

Introduction to OpenMP, The Trapezoidal Rule, Scope of Variables, The Reduction Clause, The Parallel For Directive.

Module 5

OpenMP, Parallel Program Development and Parallel Algorithms

More About Loops in OpenMP: Sorting, Scheduling Loops, Producers and Consumers, Caches, Cache-Coherence, and False Sharing and Thread-Safety, Two N-Body Solvers, Tree Search.

Course Outcomes: At the end of the course the students should be able to:

CO1: Know the fundamentals of parallel processing

CO2: Analyze the hardware and software required for parallel computing

CO3: Understand the distributive memory programming with MPI and OpenMP

Question paper pattern:

- The question paper will have ten questions.
- Each full question consists of 20 marks.
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. An introduction to parallel programming by Peter S Pacheco. 2011. I Edition ,Morgan Kaufmann Publishers

Reference Books :

1. Using OpenMP: Portable Shared Memory Parallel Programming ,Gabriele Jost and Ruud van der Pas The MIT Press (October 12, 2007)
2. Using MPI - 2nd Edition: Portable Parallel Programming with the Message Passing Interface, William Gropp and Ewing Lusk, 1999, 2nd edition, MIT Press
3. Pthreads Programming: A Posix Standard for Better Multiprocessing ,Dick Buttlar, Jacqueline Farrell & Bradford Nichols .1996, I Edition , Oreilly


12/10/2020.
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