Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
INF447	Parallel Processing	8	3	0	0	3	4

Prerequisites	INF334
Admission Requirements	INF334

Language of Instruction	
Course Type	Elective
Course Level	Bachelor Degree
Objective	This course aims to present the basic principles of parallel processing from an academic and engineering perspective. Acquires necessary algorithmic approaches to do parallel programming. Experience parallel processing by programming on a multi-computer infrastructure. This course also provides the necessary opportunities for students to internalize the concepts and methods presented in the course through multi-stage projects and assignments.
Content	Week 1 "Introduction to parallel computing. Parallel computing motivation and applications. Examination of parallel platform models " Week 2 "Physical organization on parallel platforms, network connections. Static and dynamic network connections." Week 3 Fundamentals of parallel algorithm design, task decomposition Week 4 Fundamentals of Parallel Algorithm design, dependency graphs, load balancing 5th week Performance criteria and evaluation in parallel processing 6. Week Extremely Parallel Computing 7. Week Parallelization of sorting algorithms 8. Week Midterm Exam 9. Week Parallel architecture with message transmission 10. Week Introduction of MPI standards and basic MPI library functions, transfer of sample programs 11th week Introduction of advanced MPI library functions and demonstration of sample programs Week 12 Alternative approaches: Systems with shared memory 13. Week GPU-based parallel processing methods 14. Week Advanced topics in parallel processing
References	1. Lecture notes 2. Wilkinson and Allen "Parallel Programming: Techniques and Applications Using Networked Workstations and Parallel Computers" 2nd Edition, Prentice Hall

Theory Topics

Week	Weekly Contents
1	ntroduction to parallel computing. Parallel computing motivation and applications. Examination of parallel platform models
2	Physical organization on parallel platforms, network connections. Static and dynamic network connections
3	Fundamentals of parallel algorithm design, task decomposition
4	Fundamentals of Parallel Algorithm design, dependency graphs, load balancing
5	Performance criteria and evaluation in parallel processing
6	Embrassingly Parallel Computing
7	Midterm Exam
8	Parallel architecture with message transmission
9	Introduction of MPI standards and basic MPI library functions, transfer of sample programs
10	Introduction of advanced MPI library functions and demonstration of sample programs
11	Alternative approaches: Systems with shared memory
12	Parallelization of sorting algorithms
13	GPU-based parallel processing methods
14	Advanced topics in parallel processing