University of Computer Studies, Yangon
M.C.Sc.

CS - 605 (Analysis of Parallel Algorithms)

Second Semester

Course Description

Course Code Number	CS-605	**Course Title**	Analysis of Parallel Algorithms
Semester Hours	3 Periods per week	**No. of Credit Units**	3
Prerequisite	None	**Course Coordinator**	Dr. Khin Mar Soe, Dr. Thinn Lai Soe Faculty of Computer Science
Course Length	15 Weeks	**Type of Instruction**	Lecture

Course Objective

This course introduces about parallel processing, parallel computers and parallel algorithms, and their designs and analysis. The objective of this course is to show how a parallel algorithm is designed and analyzed to solve each problem.

Course Outline

This course is designed to teach students who study knowledge engineering and software engineering. The computational problems studied in this book are grouped into three classes: (1) sorting, searching, and related problems; (2) combinatorial and numerical problems; and (3) problems arising in several application areas. These problems were chosen due to their fundamental nature.

Learning Outcomes

On completion of the course the student will be able to:

• understand parallelism, parallel processing, parallel algorithms and parallel computers
• understand several computational models for parallel processing
• study several parallel algorithms and their time complexity, cost and efficiency

Text Book

[1] The Design and Analysis of Parallel Algorithms by Selim G Akl

Reference Books

[1] Introduction to Parallel Processing (Algorithms and Architectures) by Behrooz Parhami

[2] Parallel Algorithms by Henri Casanova, Arnaud Legrand and Yves Robert

Course Organization

Student participation in this course will involve the following activities:

- Attending the lectures/ Class participation
- Assignments
- Tutorials
- Exam

Assessment Plan for the Course

Paper Exam	60 %
Assignment	15 %
Tutorial/ Quiz	15 %
Class Participation	10 %

Tentative Lecture Plan

CS – 605 : Analysis of Parallel Algorithms Second Semester

Periods : 45 Periods (50 minutes) for 15 weeks

No.	Chapter	Page	Period	Detail Lecture Plan
	Chapter (5) **Searching**		**13**	
1.	Searching a Sorted Sequence - EREW Searching - CREW Searching - CRCW Searching	112 to 119	2	Detail Explain
2.	Searching a Random Sequence - Searching on Shared Memory SIMD Computers - EREW - ERCW - CREW - CRCW	119 to 121	4	Detail Explain
3.	Searching on a Tree	121 to 128	4	Detail Explain
4.	Searching on a Mesh	128 to 132	2	Detail Explain
5.	Tutorial/ Discussion		1	
	Chapter (6) **Generation Permutations and Combinations**		**14**	
6.	Sequential Algorithm	141	4	Detail Explain

No.	Chapter	Page	Period	Detail Lecture Plan
	- Generating Permutations Lexicographically - Numbering Permutations - Generating Combinations Lexicographically - Numbering Combinations	to150		
7.	Generating Permutations in Parallel - Adapting a Sequential Algorithm - An Adaptive Permutation Generator - Parallel Permutation Generator for Few processors	150 to 158	6	Detail Explain
8.	Generating Combination in Parallel - A Fast Combination Generator - An Adaptive Combination Generator	158 to 166	3	Detail Explain
9.	Tutorial (Chapter 5 and 6)		1	
	Chapter (7) **Matrix Operations**		**15**	
10.	Transposition - Mesh Transpose - Shuffle Transpose - EREW Transpose	170 to 179	4	Detail Explain
11.	Matrix by Matrix Multiplication - Mesh Multiplication - Cube Multiplication - CRCW Multiplication	179 to 188	6	Detail Explain
12.	Matrix by Vector Multiplication - Linear Array Multiplication - Tree Multiplication - Convolution	189 to 192	4	Detail Explain
13.	Tutorial (Chapter 7)		1	
14.	Revision		**3**	