COT 6XXX: Parallel and Cloud Computation

Computer Science Division

College of Engineering and Computer Science, University of Central Florida

COURSE SYLLABUS

Instructor:	Dr. Narsingh Deo and Dr. Sumit Kumar Jha	Term:	TBD
Office:	HECF361 and HECF253	Class Meeting Days:	TBD
Phone:	(407) 823 6336 (407) 882F2215	Class Meeting Hours:	TBD
E-Mail:	deo@eecs.ucf.edu, jha@eecs.ucf.edu	Class Location:	TBD
Website:		Teaching Assistant:	TBD (Office Hours TBD)
Office Hours:	TBD		

I. University Course Catalog Description

Taxonomy of Parallel Architectures, Computation, Storage and Networking in Clouds, Models of Parallel Computations, Parallel Programming using MPI, OpenCL, CUDA, OpenMP and OpenACC, Elastic Cloud Computing, Fundamental Algorithms – Sorting, Matrix Computation, Graph, Simulation and Big Data Analytics, Parallel Complexity including P-Completeness.

II. Course Overview

This course explores parallel algorithms for problem solving in the real world. Emphasis is provided on the ability to program current and emerging parallel architectures and on extending sequential implementations to parallel solutions by employing parallel computational thinking. Formal techniques for proving correctness and analyzing the performance of parallel algorithms will also be discussed. Hardness results, approximation and randomized parallel algorithms will also be briefly surveyed in the course. The course will also study the deployment of software solutions on elastic cloud-computing platforms and the identification of networking, storage and computational challenges in the design of such clouds.

III. Course Objectives

The course has two interrelated objectives:

i. We will survey a wide variety of parallel algorithms, prove their correctness, and analyze their parallel algorithmic complexity.

ii. We will also generalize these parallel algorithms to adopt a computational thinking approach that enables us to develop parallel algorithms for new problems.

IV. Course Prerequisites

COP 5711 (Parallel and Distributed Databases) or C.I.

V. **Course Credits:** 3 units.

VI. Required Texts and Materials

i. **Quinn, M. J. (2004) *Parallel programming in C with MPI and OpenMP,* McGraw-Hill.**

ii. *Introduction to algorithms*. T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C. Stein. 3rd edition, MIT press. (Available online through the UCF library)

VII. Supplementary (Optional) Texts and Materials

i. *Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar (2003) Introduction to Parallel Computing, 2nd Edition. Addison Wesley.*

ii. *Akl, S. G. (1997) Parallel Computation Models and Methods, Prentice-Hall.*

iii. *Barlas, G.(2015), Multicore and GPU Programming: An integrated approach, Morgan Kaufmann*

iv. *Henri Casanova, Arnaud Legrand, and Yves Robert (2008) Parallel Algorithms. Chapman & Hall/CRC.*

v. *Pacheco P (2011) An Introduction to Parallel Programming. Morgan Kaufmann*

vi. *Additional references provided with every lecture.*

VIII. Contents: Modules available online at https://webcourses.ucf.edu/courses/XXXXXXX/

IX. Basis for Final Grade

We will use a semester-long class project, four (4) assignments, two (2) midterms, and a final examination to evaluate performance in this course. The overall grade for this course will be based on a weighted average of all of these components.

Assessment	Percent of Final Grade
Two Midterms	20%
Final	20%
Assignments	10%
Project	50%
	100%

Grading Scale (%)	
90-100	A
80 - 89	B
70 - 79	C
60 - 69	D
0 - 59	F