

# **COMP7330/7336 Advanced Parallel and Distributed Computing Syllabus – Fall 2015**

**MWF 9:00 - 9:50am, Shelby 1122**

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**Instructor:** Dr. Xiao Qin

**Phone/Office:** 844-6327 / Shelby 3101E

**Office Hours:** MWF 1:00pm-1:50pm

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## **Class Web Page**

Handout, assignments, and important course information will be posted periodically on the Canvas system, which you have to regularly check.

## **Prerequisite**

Prior knowledge in computer architecture and networking is required. The prerequisite courses include the following two:

- COMP 4300, Computer Architecture
- COMP 4320, Introduction to Computer Networks

## **Textbook**

Ananth Grama, Anshul Gupta, George Karypis, Vinpin Kumar, *Introduction to Parallel Computing*, Second Edition, Pearson, ISBN 0-201-64865-2

## **Course Description**

This is a graduate-level course. It focuses on leading system architecture, high speed interconnects, and programming models that have been used for parallel and distributed computing environments. This course will cover fundamental principles, advanced algorithms, and engineering tradeoffs in building large-scale parallel and distributed computing systems, as well as the high speed interconnects that bring them all together. Students will gain an in-depth understanding of research and development in HPC, and their impact on computational sciences.

## **Objectives**

The objectives of this class include:

- Grasp a thorough understanding on the advances of technologies, system architecture and communication architecture that propelled the growth of parallel and distributed computing systems

- Accomplish a good understanding of principles and practices in high speed interconnects
- Gain an appreciation on the challenges and opportunities faced by parallel systems, and cloud computing environments
- Obtain an experience on parallel programming and system evaluation on representative parallel and distributed systems.

## Topics Covered (These topics may change)

- Advances of technologies and system architectures for parallel and distributed computing
- Parallel computing algorithms
- Parallel programming models
- Message Passing Interface
- Convergence of parallel, distributed and cloud computing
- Analytical modeling and system evaluation

## Exams and Grading

Mid-term	20%
Final Exam	20%
Class Participation	10%
Homework Assignment	20%
Research Project	30%
A [90, 100], B [80,90), C [70,80), D [60,70), F [0,60)	

**Note:** In order to pass the class, you must receive at least 60% credit on the Individual Research Project, regardless of performance on exams. You are required to save all returned exams and papers until your course grade has been received. Please report grading errors or disputes to Dr. Qin within 7 days of receiving your returned assignment.

## Assessment

Exams: Midterm Exam, Final Exam

Questions will be derived from lectures, material taught only in class, and from assignments.

Research Project:

Individual Projects will be graded as follows:

Analysis, Design, and Testing Documents: 30%

Adhering to coding style: 10%

Program meets design specifications: 60%

## Attendance

Class attendance is mandatory. This is a graduate class; therefore, students will have to actively participate in class. It is believed that if you miss many classes (more than 6), there is a strong

likelihood that you will not pass the class. Please notify me in advance if you will attend conferences, research meetings, or the like.

## Reading

Students are expected to read the appropriate sections of the book before each lecture.

## Assignment Due Dates

Assignments will be submitted through Canvas. Homework assignments will always be due at 11:55 pm on the due date. Deadlines will be made as generous as possible to *a priori* take into account illness, other courses, Acts of God, and nearly all conceivable excuses. If you have a documented illness preventing you from completing your assignment, you may submit all of your partial work and request an extension. **This extension is not automatic.**

## Late Submission Penalty

There will be a ten percent (10%) penalty per day for each late submission. For example, an assignment submitted after the deadline but up to 1 day (24 hours) late can achieve a maximum of 90% of points allocated for the assignment. An assignment submitted after the deadline but up to 2 days (48 hours) late can achieve a maximum of 80% of points allocated for the assignment. Assignment submitted more than 3 days (72 hours) after the deadline will not be graded.

## Office Hours

You are always welcome to drop by during office hours to discuss homework assignment, projects, or general concepts. To get urgent help or advice out of office hours, it is recommended to send an email in advance to make an appointment.

## Cheating

Unless otherwise specified in writing, all assignments are individual projects. If any assignment permits teamwork, it will be explicitly stated so in the assignment, and the work must be only the work of the people on the team. Students are *encouraged* to work together on homework assignments. However, you have to explicitly acknowledge any help received from other students during the course of the preparation of your homework solutions.

If you make use of ideas obtained from previous work of another person, you must give credit by commenting in your report, explaining where you obtained ideas, what you have used, and who developed the ideas. If you use any code provided by another person, you must obtain permission from the copyright owner, then comment in your code, including a statement explaining where you found the code and who is the author. Failure to follow these rules will be considered a violation of the Academic Honor Code.

## **Special Accommodations**

A student in need of special accommodations must bring that need to my attention within the first two weeks of class. The need must be properly documented.

## **Study Hints**

- Ask questions in class.
- At the first sign of difficulty, talk to your instructor.
- Form a study group and meet regularly.
- Construct chapter summaries noting concepts, definitions, & procedures.