

COMP 420, COMP 532

# Introduction to Distributed Computer Systems

## Course Syllabus

### Course Description

A distributed computer system involves a number of independent computers, which do not share memory, connected by a computer network. These computers communicate with each other by passing messages over the network, generally cooperating with each other, appearing to the users as a single coherent system, for example for sharing computation, storage, or other resources.

This course will examine the concepts, architecture, algorithms, protocols, and implementation of distributed computer systems, focusing on issues such as distribution, scale, robustness in the face of failure, and security. Some of the topics we will cover include communication in distributed systems, clocks and order of events in a distributed system, distributed system fault tolerance, distributed file systems, peer-to-peer systems, and distributed shared memory.

There are two versions of this course: *COMP 420*, intended for *undergraduate students*, and *COMP 532*, intended for *graduate students*. The lectures for both versions meet together, and the projects and exams for both are the same. However, for students taking the graduate version of the course, COMP 532, there will be an additional requirements as part of each of the projects.

### Class Meetings

Monday, Wednesday, Friday, 1:00–1:50, Duncan Hall 1075.

### Instructor

Dave Johnson, [dbj@cs.rice.edu](mailto:dbj@cs.rice.edu), DCH 3007, x3063. Office hours: TBA.

### Prerequisites

Students taking this course should have already taken the Rice course COMP 421 or COMP 521, or the equivalent. In particular, you must be familiar with basic operating system concepts and design. You should also be familiar with data structures and basic computer architecture concepts, and must be proficient in C/C++ programming on UNIX/Linux systems. All programming projects in this course must be done in C or C++.

### Text

The required textbook for the course is *Distributed Systems: Concepts and Design*, by George Coulouris, Jean Dollimore, Tim Kindberg, and Gordon Blair, *Fifth Edition*, published by Addison-Wesley/Pearson, 2012. The book is available from many on-line retailers such as Amazon.com and barnesandnoble.com.

Note that we will cover topics in more depth than in the book and will also cover some in a different order. There will also be a few additional reading assignments, to be handed out in class during the semester.

## Assignments

The assignments in this course will include two programming projects, plus a midterm exam and a final exam.

The exams may cover *any* material covered in the course. This includes the material from the lectures, from the assigned sections of the textbook, from any additional reading assignments handed out, or from the programming projects. The final exam will not be cumulative and will be weighted the same as the midterm exam in the grading.

All of the programming projects in this class must be done *individually*. The projects must be done on the Rice CLEAR system running Linux.

## Grading

Your final grade for the course will be computed based on the following tentative weights for the individual assignments:

- 25% First programming project
- 25% Second programming project
- 25% Midterm exam
- 25% Final exam

In addition, your weighted project average and weighted exam average must each be a passing grade in order to pass the course.

Any request for a regrade on an assignment must be submitted within one week after grades for that assignment are available (either when the graded assignments are returned or when they are made available for you to pick up). All regrade requests must be made in detail, in writing. For a regrade request on an exam, you must also attach to the request the entire graded *original* copy of your exam.

## Course Web Site

The course web site is located at

<http://www.clear.rice.edu/comp420/>

This course syllabus as well as other up-to-date information about the course will be available via this web site. Online versions of handouts distributed in class will also be available there. Course announcements, such as schedule changes, clarifications to the assignments, and reading assignments will also be posted to the course web site. Please check the web site regularly for announcements.

We will also be using *Piazza* for class discussion. Piazza is a web-based platform that will allow you to post questions about the course material, including the course projects, and to quickly receive answers from me, from the TA, and from your fellow classmates.

Please register now for the course on Piazza by going to

<https://piazza.com/rice/fall2018/comp420>

Throughout the semester, in addition to regularly checking the course web site, you should also check Piazza regularly for new information. In addition to finding answers to your own questions, reading other questions and answers on Piazza can help you find additional valuable information including project assistance and clarifications and schedule updates.

## Honor Code Policy

*The Honor Code is a special privilege and responsibility at Rice University.* As stated in a student editorial published in the January 20, 2016 edition of *The Rice Thresher*: “As incoming students enter Rice, many are surprised by the degree to which the university’s Honor Code extends trust to the student body. . . . The privileges of the Honor Code stem from the idea that Rice’s aim is not just to instill knowledge in its students, but [to] also help them develop moral character. This idea is fundamental to Rice’s identity: Students can and should be held to a high moral character standard.”

Specifically, all assignments in this course are conducted under the Rice Honor System, and you are expected to behave in all aspects of your work in this course according to the Rice Honor Code. When in doubt as to whether a specific behavior is acceptable, ask the instructor for a written clarification. *Suspected Honor Code violations on the projects and/or exams in this course will be researched, documented, and reported in extensive detail to the Rice Honor Council or Rice Graduate Honor Council.* For more information on the Rice Honor System, see <http://honor.rice.edu/> and <http://gradhonor.rice.edu/> . In particular, you should consult the Honor System Handbook at

<http://honor.rice.edu/honor-system-handbook/>

This handbook outlines the University’s expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

For the midterm exam and final exam in this course, your solutions, of course, must be your own work. During each exam, you may refer to the course textbook, *Distributed Systems: Concepts and Design*, Fifth Edition, to any of the handouts from class, and to your *own* notes you made yourself from any source *before* opening the exam package. You may *not* refer to any other sources, such as past exams or things from the web or elsewhere, during the exam. You may not receive help from anyone else while you are taking the exam, and you may not provide help to anyone else while they are taking the exam. After completing the exam, you may not discuss the exam or any of the questions on the exam in any way with anyone until after the due date for that exam for the entire class.

For the programming assignments in this course, students are encouraged to talk to each other, to the TA, to the instructor, or to anyone else about the assignment. This assistance, however, is limited to general discussion of the problem; *each student must produce their own solution to each programming project.* Consulting or copying, in any manner, another solution is prohibited, and submitted solutions may not be copied from any source.

In addition, for all programming assignments, you may not place the source code for your project on any *publicly accessible* repository (such as GitHub), including after the end of the semester, and you may not refer to any such repository (or other sources) in working on or producing your solution for such project.

*I want to treat you all in this class as responsible adults.* But please be aware that *cheating* on any of the programming projects or exams in this class constitutes a *Rice Honor Code violation*. Submitting a case to the Rice Honor Council requires a lot of work on my part, but it will have a much larger impact on you, your future status as a student at Rice University, and your prospects for a degree from Rice. Please do not make me have to submit any Honor Council cases in this class. This will help both you and me. As I said, I want to treat you all in this class as responsible adults.

## **Policy on Late Work**

Take project deadlines seriously. Late assignments will not be accepted, except when there are extenuating circumstances. If you are aware of unusual circumstances that preclude a timely submission (e.g., you have to be out of town for a wedding or job interview on the submission date) submit the assignment early or contact the instructor in advance to arrange for delayed submission if warranted. After-the-fact explanations will not be treated favorably. Sometimes, of course, unusual circumstances may arise without prior notice, but even in those cases, you should try to alert the instructor (e.g., by email) before the submission deadline.

## **Students with Disabilities**

If you have a documented disability that may affect your academic performance in this class, you should: (1) make sure this documentation is on file with Rice's Disability Resource Center (located in Allen Center room 111, [adarice@rice.edu](mailto:adarice@rice.edu), x5841) to determine the accommodations you need; and (2) meet with me to discuss your accommodation needs.