CSCI 351: Distributed Computing
Syllabus

Prof. Edward Talmage

Fall 2026
This Syllabus Subject to Change

Instructor: Edward Talmage

- Office: Dana 329
- Office Hours: Mon, Wed, Fri: 10AM-12PM, Tue: 2-4PM, Wed: 3-4:30PM, or by appointment
- Email: [first].[last] [at] bucknell.edu
- Discord: etalmage#2458
  - Email is the preferred and most reliable way to contact me. Please use "CSCI 351: [Brief Description Here]" as the subject line to ensure I find the message.
  - Do not assume that I will respond quickly after hours or on weekends. I try to respond to any time-sensitive emails at some point during weekday evenings and Saturdays, but may or may not have time to. I will not respond on Sundays unless I realize there is an emergency.

Schedule: Monday, Wednesday, Friday, 2-2:50PM, Dana 134

Textbook: *Distributed Computing: Fundamentals, Simulations, and Advanced Topics, 2nd Edition*, Hagit Attiya & Jennifer Welch, Wiley Interscience 2004, ISBN 0-471-45324-2/978-0-471-45324-6.

Other books (available to you for free!) which may be useful:

- *Distributed Algorithms*, Nancy Lynch.
  `https://dl.acm.org/doi/book/10.5555/2821576` or
  `https://bucknell.on.worldcat.org/oclc/179692020`
- *Distributed Algorithms for Message-Passing Systems*, Michel Raynal.
  `https://bucknell.on.worldcat.org/oclc/852688979`

Web Resources

- Course website, where I will post lecture notes:
  `https://csci.courses.bucknell.edu/news/csci-351-fall-26/`
- Moodle, where I will post homework assignments
- Gradescope, where you will submit assignments and receive grades

Course Goals:

This course intends to introduce you to distributed computing and teach you to reason about concurrent execution. We will look at several of the classic problems and models from the field, emphasizing the differences in possible solutions based on model assumptions.

After taking this course, you should be able to design algorithms to solve computing problems in a distributed system, applying known solutions to classic problems as parts of your solution. You will also be able to discuss the tradeoffs in using different models of distributed systems.

Learning Goals: After this course, you should be able to

- demonstrate benefits and limitations of distributed computing,
- demonstrate standard solutions to classic problems in distributed computing,
- solve distributed computing problems,
- reason about computation in a concurrent setting, and
- understand the high-level problem and final solution of a research paper.

Health and Safety

If you are sick, please **do not attend class**. When you miss class, you are expected to communicate with me to answer any questions you may have and ensure you have a complete understanding.

The question will naturally arise: "How sick is too sick to come to class?" This is not an easy question to answer and you will need to use your best judgement, but I encoursage you to err on the side of safety. At a minimum, if you have a fever ($\geq 100^\circ$ F), please do not attend. If you have a minor illness, please wait until you have been fever-free for 24 hours before returning to class. If you are missing class because you are ill, please notify me by email as soon as is reasonably possible. Please, be safe and care even more for those around you than for yourself.

Recording While you are welcome to take still photographs of the whiteboard to supplement your own note-taking, you are not permitted to take audio or video recordings in the classroom, except as part of a formal accommodation approved by the Office of Accessibility Resources.

Course Components, Their Purpose and Grading:

- Participation (15% of course): Class discussion, in-class group exercises, engagement in office hours, etc. You are expected to attend all classes. If you will miss a class due to extenuating circumstances or a university-approved absence, inform me as soon as possible, in advance, so that we can plan accordingly.
- Quizzes (15% of course): Weekly checks to make sure you are keeping up with the specific topics and techniques from lecture. You will have two opportunities to get points on each quiz question. If you get a question wrong, *take time to reinforce your understanding of that topic* before retaking it.
- Problem Sets (15% of course): Every two weeks. These are to help you exercise and develop a deep understanding of the material and practice your problem-solving and communication skills. **Submissions must be typeset in LaTeX**.
- Exams (three, worth 15/15/20% of course): Two midterm exams, one final. Cumulative evaluation of your total comprehension of the material.
- Projects (10% of course): We will have a few small projects to see how the algorithms we study work on real systems.
- This totals 105% of the total grade possible, but I will assign grades out of 100%. This is to give you some wiggle room to make up for a bad exam or the like. All components are mandatory.

Participation: Regular attendance is a necessary condition for your participation grade, but is not sufficient. You do not need to speak in every class, but you should regularly ask or answer a question, make an observation, participate in discussion, etc. You are required to participate in classroom activities. You can also earn credit towards the participation grade outside of class, though discussions in office hours, etc.

Quizzes and Homework: Quizzes are online in gradescope. I will post homework on moodle (including LaTeX source) and gradescope, submitted on gradescope.

- **LaTeX:** You must typeset homework solutions in LaTeX, for which I will provide a template you may use. If you are unfamiliar with LaTeX, please ask me for help.
- **Groups:** You must complete quizzes entirely alone, without resources beyond your own knowledge and not discussed with anyone but the professor. You are welcome to work on homework in groups of any size. If you work in a group, be sure to add **all** members of the group to the author line and to the gradescope submission.
- **Late Policy:** You can turn in Homeworks up to two days late, but will lose 10% per 24 hours, rounded up, that pass after the due date. If you will be turning in an assignment late, you MUST email me before the due date to inform me it will be late.

Conflicts If you have a scheduling conflict with any part of the course (particularly exams), please inform me at the beginning of the semester, or as soon as possible, and remind me at least one week in advance. There is no guarantee that you will be able to make up an exam missed without prior permission. I will accommodate any religious conflicts to the very best of my ability.

Accommodations: If you need accommodations for any form of disability, please speak to Bucknell's Office of Accessibility Resources **first**, and then **also** the instructor ASAP so that we can provide appropriate accommodations. We want to provide the best learning environment possible for every student, but need your input to know how best to do so.

Tentative Schedule

Topics: This is an approximate list of the of the topics for the semester and the order in which I expect we will progress through them. This **will** change without further notice depending on the pacing of class.

#	Date	Topic	Chapters	Notes
1	8/24	Introduction, Formal Models	1, 2.1	
2	8/31	Leader Election I	3	
3	9/7	Leader Election II	3	
4	9/14	Mutual Exclusion	4	
5	9/21	Consensus I	5	
6	9/28	Consensus II (Impossibility)	5	
7	10/5	Time, Clocks, and Causality	6	Exam 1 tentatively Fri, 10/9
8	10/12	Clock Synchronization	6	No Class Monday: Fall Break
9	10/19	Broadcast, Multi-Cast	7, 8	
10	10/26	Stronger Broadcasts, DSM	9	Exam 2 tentatively Fri, 10/30
11	11/2	Register Strengthening I	10	
12	11/9	Register Strengthening II	10	
13	11/16	Failure Detectors, Randomized Consensus	14	
14	11/23	None		No classes: Thanksgiving Break
15	11/30	Topics		
16	12/7	Review		Last day of class: Mon, 12/7
17	5/8	Finals Week		Final: Tue, 12/15, 7:30-10:30PM