CS6963: Evaluating Networked Systems

Syllabus and Grading Policies

April 16, 2015

Course Information

Description and Goals
The goal of this course is to acquaint students with the theory and practice of evaluating systems that have a network as a major component. At its conclusion, students should be prepared to conduct rigorous evaluations as part of their own research, as well as looking with a critical eye at evaluations they find in the literature. It will have a major hands-on component, using testbed facilities such as Emulab, GENI, and PlanetLab. Topics will include experiment design, avoiding typical evaluation pitfalls, basic statistical analysis of empirical data, presentation of results, and use of the available tools.

Prerequisites
B- or better grade for CS 4480, or instructor permission. Instructor permission will require the student to show a mastery of basic computer networking topics such as those covered in “Computer Networking: A Top-Down Approach” by James F. Kurose and Keith W. Ross.

Instructor
Robert Ricci, ricci@cs.utah.edu, 3490B MEB.

Meetings
Tuesdays and Thursdays, 3:40–5:00 in 1248 WEB

Textbook

Website
We will use the University of Utah’s Canvas site as the main repository for documents for the class, such as handouts. The site for the class is: https://utah.instructure.com/courses/319715.

Handing in Homework
All homework will be handed in using git on the gitlab.flux.utah.edu site. All submitted assignments must be digitally signed by the student. Documents (reports, solutions to problems from the book, etc.) must be submitted as PDFs. Because careful, rigorous procedures are a major theme of the class, students are expected to turn in all materials used to produce their results, including notes, scripts, data files, “source” for documents, etc.
## Student Evaluation

### Grading

Grading for the course will be based on:

1. class participation (10%)
2. homework assignments (20%)
3. paper analysis assignments (25%)
4. lab assignments (25%)
5. final project (20%)

### Submitting

All assignments will be submitted as git repositories. Assignments must be submitted by the beginning of class on the assigned date or they will be considered late. All written assignments, reports, etc. must be turned in as PDFs. Supplementary materials submitted (eg. notes, data files), will not be graded directly. However, they may factor into grading as evidence of sufficient rigor, originality, etc.

### Late submissions

Late assignments will be accepted up to two days late with a 10% penalty applied for each day late. The instructor must be notified via email of late submissions by midnight on the day preceding the original due date, and the instructor must be given access to the student’s repository for the assignment at this time.

### Class participation

Students are expected to attend all lectures and participate actively in class discussions. If a student misses more than two lectures, or does not participate in discussions throughout the semester, they may be given less than full credit for this portion of the grade.

### Homework assignments

Throughout the course of the semester, several assignments will be given from the textbook. Assignments must be handed in as PDFs, and will be returned as annotated versions of those same PDFs. All homework assignments will be given equal weight.

### Paper analysis

Students will be asked to analyze the evaluation sections of multiple papers throughout the semester. Students will be asked to give one short presentation in class, which will count for 1/3 of the analysis grade. Papers analyzed must be published in quality conferences or journals in the area of networking or distributed systems. Unless otherwise stated, the student’s own work, as well as the course instructor’s, is acceptable.

### Lab assignments

Students will be asked to conduct hands-on lab assignments using Emulab and/or GENI. The primary deliverable for each lab assignment will be a short report analyzing a particular system. Students must also submit all materials necessary to reproduce the results included in the report, including source code for the system being analyzed, scripts to run experiments, intermediate data files, scripts to analyze data and produce graphs, experiment description files (such as Emulab NS files or GENI RSpecs), etc.

### Final project

The final project will be like the lab assignments, with the difference that the student may select their own system to evaluate, and a short presentation in class will be required.
**Letter Grades**

Before assigning letter grades, all scores will be normalized to the scores of the student with the highest total score. If the highest scoring student is an outlier, defined as being more than 5% higher than the second-highest scorer, the second-highest score will be used as the basis for normalization. Letter grades will be assigned according to the following table:

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>95–100%</td>
<td>A</td>
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<tr>
<td>90–95%</td>
<td>A-</td>
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<tr>
<td>85–90%</td>
<td>B+</td>
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<tr>
<td>80–85%</td>
<td>B</td>
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<tr>
<td>75–80%</td>
<td>B-</td>
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<tr>
<td>70–75%</td>
<td>C+</td>
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<tr>
<td>65–70%</td>
<td>C</td>
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<td>60–65%</td>
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<td>50–55%</td>
<td>D</td>
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<td>&lt; 50%</td>
<td>E</td>
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**Appeals**

Appeals of scores must be submitted by email to the instructor within one week of receipt of the score.

**Policies**

**Cheating Policy**

This class is subject to the School of Computing’s policies covering cheating and academic misconduct, which can be found online at [http://www.cs.utah.edu/graduate/cheating_policy](http://www.cs.utah.edu/graduate/cheating_policy). Any instance of cheating will result in a failing grade for the course, and multiple instances may result in automatic dismissal from the program. For the purposes of this class, cheating is defined as:

1. Misrepresenting the work of others as your own
2. Misrepresenting earlier work of your own as new work for this class
3. Falsifying any data used in assignments

Note that use of properly attributed material from other sources, clearly marked as such, is not considered cheating. Discussing assignments with others inside or outside of class is also not considered cheating, so long as the work that you turn in, including the writing, experiments, data, etc. is your own. For any group assignments, “your” is interpreted as including all members of your group. If you have any questions regarding whether something is considered cheating, you are encouraged to contact the instructor before turning the work in.

**Behavior in Class**

Students are expected to maintain professional behavior in class according to the University of Utah Student Code, which is available at [http://www.regulations.utah.edu/academics/6-400.html](http://www.regulations.utah.edu/academics/6-400.html). Students should read the Code carefully and know what their responsibilities are. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behavior, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee.

**College of Engineering Guidelines**

For information on withdrawing from courses, appealing grades, and more, see the College of Engineering Academic Affairs website at [http://www.coe.utah.edu/academics](http://www.coe.utah.edu/academics).
Students With Disabilities

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.

Topics Covered

The following topics will be covered in the course; each topic roughly corresponds to one lecture. This list is subject to change.

Introduction to networked systems evaluation

- Course overview
- Introduction to the evaluation of networked systems (Ch. 1)
- Common mistakes (Ch. 2)
- Workloads (Ch. 4 & 5)
- Monitors (Ch. 7 & 8)
- Data presentation (Ch. 10)
- Ratio games (Ch. 11)

Presenting measured data

- Summarizing measured data (Ch. 12)
- Comparing systems (Ch. 13)
- Linear regression (Ch. 14)
- Evaluating evaluation sections
- Student presentations of evaluations

Running experiments

- Introduction to experiment design (Ch. 16)
- Available network testbeds
- Running experiments on GENI
- Running experiments on Emulab
- Common workload generators
- Common evaluation tools
- What are you measuring?
Statistics

- Introduction to simulation (Ch. 24)
- Statistical distributions (Ch. 29)
- Using GNU R to test statistical distributions