

Syllabus

0.1 Staff Information

Instructor	Dr. Justin P. Rohrer
Office	Glasgow East 118
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Email	jprohrer@nps.edu (preferred)

I am happy to answer questions via email and/or in person and you are welcome to drop by my office at any time. I am often out of my office due to teaching or meetings, so recommend scheduling a time to meet if you are going to be making a special trip to my office.

0.2 Meeting Times

Lecture (GE-B10)	T: 10:00–11:50 Th 09:00–10:50
Lab (N/A)	N/A
Final Presentations (GE-B10)	03/17: 10:00–11:50

0.3 Class Description

CS4554 Network Modeling and Analysis (4-0). The purpose of this class is to learn to accurately model communication networks and to thoroughly analyze the results of this modeling. In the process, students will acquire a deeper understanding of both challenged (e.g. tactical) network environments and the network protocols developed for such environments. A number of simulations and emulation environments will be used as tools for this purpose. Particular emphasis will be placed on developing monte-carlo style simulations, as well as computing and presenting the relevant statistical simulation results. Reference material for lectures will primarily consist of past and present research publications, which will be assigned as required reading prior to the class in which they are presented. Simulation tools designed for varying levels of abstraction (including ns-3, the ONE simulator, MATLAB, and GNS3) will be demonstrated. Students will gain experience in evaluating the correct level of abstraction to apply to a particular modeling requirement in the homework assignments. The class will study the effect network challenges and protocols for challenged environments using these tools. Students will be encouraged to develop their own modeling requirement and address it using the appropriate simulation tool as a final project.

PREREQUISITE: CS3502

0.4 Course Goal

Students will gain experience in evaluating the correct level of abstraction to apply to a particular modeling requirement, and thus the correct simulation tool to apply to the problem. They should also be able to critically evaluate the accuracy of modeling and simulation results (their own or others).

0.5 Textbook

We do not have a required textbook for this class. We will discuss selected literature readings, which will be distributed via the class website. As an optional reference we also recommend: *The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling*

ISBN: 0471503363

By Raj Jain, Wiley-Interscience, 1991.

0.6 Class Schedule

This is a seminar-style class, consisting of a mix of interactive lectures and problem solving exercises that will be used to investigate the subject material. Students are responsible for reading all required material (papers) prior to its presentation and discussion. This is to enable students to take an active role in discussions, which is a significant portion of the course grade.

Our schedule will evolve over the duration of the quarter; check the website frequently, as it is the primary mode of coordination.

0.7 Homework

As this is an *applied* course on network modeling and analysis, there is a strong emphasis on hands-on homework exercises which account for a significant portion of your grade. Homework will be assigned via the web site and most cases be discussed in class. Assignments will vary in scope, in some cases spanning multiple weeks. Due dates will be posted on the class schedule. All homework will be submitted via the Sakai website. You may discuss your homework with others in the class, but your solutions and writeup must be exclusively your own. *You must list all collaborators.*

0.8 Project

Each student will be expected to complete a final project, either individually or as part of a 2-person team (for larger projects). General project scope might include creating a simulation model of a known network protocol and comparing its performance with existing simulation models using monte-carlo style analysis. Alternatively the student might choose an existing simulation model of a network protocol and contribute their own original enhancement to

the protocol, finally analyzing the change in performance between the original and enhanced protocol. Project materials will be submitted for grading via the Sakai website.

0.9 Exams

We will have one midterm exam during a regularly-scheduled class period.

0.10 Grading

Component	Number	Weight
Homework	6–7	30%
Midterm	1	30%
Project	1	30%
Class Participation	$< \infty$	10%

Late work accrues a penalty of 10% off per day.

0.11 Notices

Academic honesty: Abide by the **NPS Honor Code**, *no exceptions*.

As stated in the NPS Student Information Handbook and Academic Honor Code, all students are expected to complete their own work, understand and avoid plagiarism, and follow NPS policy on academic integrity and honesty. Anyone found violating these standards will be punished. Simply put: *Give others credit for their ideas and do not misrepresent others work, words, or creations as your own.* If you have **any** questions, ask **before** you submit your papers!

Note: NPS is a government organization, not just an academic institution. You are *risking your entire career*, not just your course grade, if you willfully violate the Academic Honor Code.

Citation Style: NPS uses Chicago notes-bibliography style for citing. Proper citing is a requirement for academic papers and good practice for writing your thesis. For reference please see <http://libguides.nps.edu/citation/chicagonb>.

Graduate Writing Center: Use of the GWC is optional, but highly recommended if technical writing is not your strong suit. Consultation could involve anything from brainstorming, dissecting readings, outlining, organization, argumentation, grammar, punctuation, citing,

or paraphrasing. See <https://my.nps.edu/web/gwc/meet-with-a-writing-coach>. The Graduate Writing Center (GWC), located on the first floor of the Dudley Knox Library and at <https://my.nps.edu/web/gwc>, is a resource for all NPS students, regardless of their comfort or proficiency with academic writing. The center offers one-to-one coaching, hands-on workshops, and online and hard-copy reference materials to support students throughout their time at NPS.

Reasonable Accommodations for Students with Disabilities: Any student who feels he or she may need an accommodation based on the negative impact of a disability on their work should contact their program officer and professor to discuss specific needs. Please see <https://my.nps.edu/web/gwc/special-needs-reasonable-accommodation> for more information.