

Syllabus

Overview

This class is directed at graduate students seeking a deeper understanding of operating systems. We will cover classical topics and algorithms from operating and distributed systems, and also look at recent trends in operating systems research. This class is particularly targeted at graduate students wanting to pursue systems research. Students are encouraged to submit topics that interest them for inclusion in the class.

The course format will be a mix of lectures and student presentations. Students will learn how to read, summarize and present research papers and how to evaluate them.

Students will complete a term project, which can either take the form of a programming project or a survey paper on a research area. Every student is required to give a final presentation for their project or paper.

Staff Information and Meeting Times

Instructor: Dr Godmar Back

Torgersen Hall 2160A

gback@cs.vt.edu

1-3046

Office hours: Tuesday and Thursday from 1-2pm and by appointment (please send email)

Class website:

<http://courses.cs.vt.edu/~cs5204/fall05-gback>

Blackboard at <http://learn.vt.edu/> will be used for posting grades and for a forum in which students can exchange information.

TA: Wensi Xi

Torgersen Hall 2160

Office Hours: see website

Class meets Monday, Wednesday, and Friday in 230 McBryde from 11:15am to 12:05am. (Note the room was changed from the originally scheduled room MCB 212.)

Prerequisites

This class is offered to graduate students interested in systems research. We expect that you are familiar with basic operating systems ideas and principles, and that you have a proficient programming background if you are doing a programming project.

Textbook

Most of the reading will be assigned papers. Exams questions will also primarily be drawn from those papers. I will also point out additional reading where applicable. If you wish to brush up on your operating systems basics, I recommend the following textbooks as background:

- Silberschatz, Galvin, Gagne: *Operating Systems Concepts*, 6th Edition, John Wiley and Sons
- Gary Nutt: *Operating Systems*, 3rd Edition, Addison Wesley
- William Stallings: *Operating Systems Internal and Design Principles*, 5th Edition, Prentice Hall

For background on distributed systems, I recommend

- Andrew Tanenbaum and Maarten van Steen. *Distributed Systems: Principles and Paradigms*, Prentice Hall, 2002

Format

The course work consists of a mix of exams, student presentations, a programming project or survey paper, and class participation in the discussions.

Midterm: There will be two short in-class midterms. The questions for the midterm will be primarily drawn from a subset of the assigned papers, but will also cover material from the lectures.

Paper and presentation evaluations: All students are required to read and evaluate the papers that are being discussed in class in advance. This will require reading approximately 2 papers a week. A paper evaluation form is available at the class website. Your evaluation should address the questions on this form. You will submit your evaluation forms electronically as a *PDF file* before the beginning of the class (preferred) or as a hardcopy at the beginning of class. In both cases, the limit is one page. **Late submissions will not be accepted.**

In addition to evaluating the paper, you will evaluate the speakers' presentations during class and submit a short written evaluation (one for each speaker) at the end of class.

In lieu of a late policy, you will have *six wildcards* for both the paper and speaker evaluations. That is, you may skip the evaluations that are due on six different dates without losing any credit. You need not ask for permission to do so in advance. However, you are still responsible for the material covered in class for the purposes of exams.

Class participation: I will not count how often you say something in class. A discussion typically works best if all students have read the paper beforehand and are prepared to contribute to the discussion. Mainly, I will observe your contributions in class to ascertain if you have made an honest effort to read and understand the paper. I will give feedback on class participation halfway through the semester by assigning one of three labels: insufficient participation, sufficient participation, and above-average participation.

Paper presentation: Every student will prepare a 25 minute presentation on an assigned research paper. Your presentation should contain two parts: one in which you present the work as if it were your own, and a second part in which you present your evaluation of the work. You will meet with the instructor or TA before your presentation to discuss your slides. You must have a complete draft of your slides ready by that time.

Project or survey paper. You have the choice to either write a survey paper or to implement a project for this course.

Instead of merely summarizing a number of papers, a *survey paper* should explore a particular research area or controversy. It should include a historical perspective that explains the relevance of the chosen research topic. It should outline the design space, compare and contrast multiple different approaches to a problem and discuss their trade-offs. Students may suggest topics for survey papers or pick topics from a list. Survey papers should not exceed 12 pages in length, assuming an 11pt font single-spaced layout. This hard limit will be enforced. Students choosing the survey paper option will need to submit a paper proposal (max 2 pages) that includes the results of a preliminary literature search.

A *project* can take multiple forms. For instance, your team may design, prototype, and evaluate a small system that solves a

distributed programming problem. Or you may design a project that evaluates an existing system's suitability for a particular purpose. Or you may add an extension to a system like Linux. You are encouraged to come up with your own ideas for a project, or choose from a posted list. This is your chance to take the time and get the support and even credit for the system project you've always wanted to do!

Students choosing the project option will submit a 2 page project proposal that should outline the project. The proposal should explain what problem you are addressing and the relevance of that problem. You should outline what infrastructure (software and/or hardware) you will be using for that project and how you expect to evaluate your results. You will need to define what deliverable your project will have.

To ensure progress towards the completion of your project or paper, your team will meet with the instructor during certain milestones, which will be posted on the class website. Those meetings are mandatory for full credit on the project.

Final Presentation. All teams are required to do a final 20 minute presentation that summarizes the results of their survey paper or programming project.

Grading

I estimate that the contributions of the different portions to your final grade will be as listed below, but I reserve the right to adjust these weights as necessary:

30%	2 Midterms
10%	Paper evaluations + class participation
10%	Research Paper Presentation
40%	Project or Survey Paper
10%	Final Project Presentation

Collaboration Policy and Honor Code

On the class website you will find links to the following policies applying to this class: University Policy of Class Attendance, the Honor Code, and the ACM and IEEE Code of Ethics.

The tenets of the Virginia Tech Graduate Honor Code will be strictly enforced in this course, and all assignments shall be subject to the stipulations of the Graduate Honor Code. For more information on the Graduate Honor Code, please refer to the GHS Constitution, located online at <http://www.gradhonor.grads.vt.edu/>

The following policies regarding collaboration apply in this class.

- You may discuss the papers being read with other students (and are encouraged to do so), but the evaluation you write must be your own.
- When you prepare your presentations, you may do dry runs in front of other students and solicit feedback on your slides from them.
- If you choose the survey paper option, you will work individually. When writing your paper, pay particular attention to the proper citing of sources and references. You are specifically required to *read and follow* the guidelines stipulated in Appendix IIIa of the GHS constitution posted at <http://www.gradhonor.grads.vt.edu/ghsconst.html#app3a>
- If you choose the project option, you may work in groups of 2-3 students. It is expected that the normal group size be 2 students. (Groups of 3 students will have to justify that the scope of the project warrants the size of the group.) Students must contribute equally to the project within a group. It is not acceptable for students to either not contribute to the project or not to let other group members contribute to the project. Please bring any problems in this regard to the instructor's attention early on.
- If you have any doubt about what is and is not allowed, it is your obligation to ask the instructor beforehand.

Students with Disabilities

If you need adaptations or accommodations because of a disability (learning disability, attention deficit disorder, psychological, or physical), if you have emergency medical information to share with the instructor, or if you need special arrangements in case the building must be evacuated, please meet with the instructor as soon as possible.