

# Course Syllabus

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## OMS CS6675 Advanced Internet Computing Systems and Application Development

[Summer 2026]

### Instructor Information

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### General Course Information

#### Description

Advanced Internet-scale systems and applications are geographically distributed, highly available, incrementally scalable, and dynamically configurable.

This course will cover concepts, techniques, and optimizations in advanced Internet systems and application development, combined with in-depth study of fundamental principles underlying Internet computing. The course will also explore new challenges and research issues that are critical for developing Internet-scale computing systems and applications.

Main topics to be covered include fundamentals of search engines, (incl. robots and indexing servers), Web servers, application servers, peer to peer overlay networks, content distribution networks, Internet scale social computing systems, Decentralized crypto-currency

networks like Bitcoin and Blockchain systems, edge computing, mobile computing, Internet of Things, including sensor networks and applications. One of the important goals of the course is to look beyond the present status of the Internet computing systems and applications, and conjecture new innovations for future Internet technologies and applications.

## Course Learning Outcomes

Upon successful completion of this course, you should be able to gain better understanding about important technical questions that Internet-scale systems and advanced application developers are facing today. Here are some examples: How would you build a web service that can handle billions of frantic requests? What systems support do we need for developing applications of Internet scale? Can we provide dynamic configuration, replication, and migration of Web services? What new techniques will enable Internet systems and applications to better exploit high-speed networks? How should traditional systems issues, such as fault-tolerance, resource management, performance, and security, be provided in a system of Internet scale? How much data can an internet scale system process? What does big data technology mean to a computer scientist, a data scientist, or a business owner?

## Required Course Materials

There is no suitable textbook for this course.

The course materials include lecture notes from the instructor and the required reading list (a collection of papers, one per week).

**Special note for summer session:** This course is designed for regular session of 16 weeks. Summer session is a total of 12 weeks, but we provide students taking it in the summer semester the course materials for all 26 modules. Due to the shortage of 4 weeks, the course project will be removed as a mandatory component in the summer semester. We also adjust the grading policy to reflect this change for the summer semester.

## Grading Policy:

Students will be evaluated by ten homework assignments, a midterm test and a final exam test, and a project.

Grades will be computed using the following weighting scales:

- **Assignments: 50%** [5% for each of the ten assignments]
- **Midterm test: 20%**
- **Final-exam test: 20%**
- **Participation: 10%**

**NOTE:** The deadline for all submissions (assignments and tests) will be 11:59pm Eastern on Sundays and we will have a graceful period with no penalty by 9am Eastern on Mondays to accommodate those in different time zones.

## Description of Graded Components

### **Written Assignments (50%)**

The goal of the homework assignments is to help the students to master the knowledge learned from lectures through reading critiques on a selection of topics covered in the lectures. All homework assignments are individual assignments. They will be made available on Canvas under Assignment Tab in the beginning of the semester.

There are ten written assignments in the course: five Principles assignments and five Methods assignments. Each P assignment asks you to answer four questions, and all four questions are weighted equally. Each M assignment asks for a more thorough plan for performing research and development exercises on an Internet computing system/service/application from a list of given choices. These ten assignments together comprise 40% of your grade with each assignment worth 4% of your grade. All assignments should be written in MS word or google doc or Latex in single spacing, font size 12 pt and font size Arial or Times New Roman font face. All assignment submissions should be in PDF. Each of the ten homework assignments is graded using the scale of 100 points, and worth 5% of the total course grade.

### **Midterm Exam (20%) and Final Exam (20%)**

Midterm exam (Test-1) and Final exam (Test 2) are graded using the scale of 100 points. The goal of these two exam tests is to consolidate the knowledge and learning experience of students about the materials covered in the course modules.

The midterm exam (Test 1) covers the first half of the course (modules 1~7) and is worth 15% of your overall grade.

The final exam (Test 2) covers the second half of the course (modules 8~13), and is worth 15% of your overall grade.

Each question is multiple-choice, multiple-correct with five choices and between 1 and 4 correct answers. Partial credit is awarded. Both midterm and final exam tests are delivered via Canvas.

### **Participation (10%)**

In this course, students will earn participation grade in several ways. The goal is to encourage each

student in the class to interact with your peers, to participate in one another's assignment reviews and project check-in reviews, and to see the variety of approaches taken by your classmates in the assignments and projects. Examples of earning participation credits include completing peer reviews, participating in discussions on Ed Discussion. All types of participation are graded on not only quantity, but also quality. For example, peer reviews and Ed Discussion contributions only receive credit if they are substantive. Additional incentives are built in to encourage the completion of peer reviews quickly. The project is graded using the scale of 100 points and is worth 10% of your final grade.

### **Letter Grade Policy.**

The total grade is the sum in percentages of HWs, Project, Midterm exam (Test 1), Final exam (Test 2), and Participations you have earned, and we will convert the total percentage in the scale of 100 points to the following letter grade:

- [90-100] corresponds to letter grade A
- [80~90) corresponds to letter grade B
- [70~80) corresponds to letter grade C
- [60~70) corresponds to letter grade D
- [0~ 60) corresponds to letter grade F

### **Projects (not required for Summer semester)**

**READ ME:** During summer semester, we have 12 weeks instead of 16 weeks in the regular (fall or spring) semester, we place the project as an option. It is not a part of the grade for summer session, but if you may choose to do it in your spare time. If you would like to submit it for credit, you may inform the head GTA. We will consider giving you extra credits only when your project is reaching the quality level that deserves extra credits. Only showing the amount of efforts/time you put in does not translate to extra credits.

## Course Policies

### Attendance Policy



For OMS CS course, there is no mandatory attendance recording each week throughout the semester. However, each student is required to participate the class by performing the following tasks according to your own weekly schedule:

1. Listen video lessons for each course module,
2. Complete the reading of assigned paper in our reading list of the semester each week,
3. Perform each of the ten homework assignments, which are designed to consolidate your learning of the course modules,
4. Complete your class wiki-page entry to facilitate the communication among classmates in this semester,

5. Complete the course surveys required, and
6. Participate in and contribute to the course Ed-discussion forum, for example, you are encouraged to ask good questions, to provide answers based on your own experiences and knowledge, and to share your learning experiences on course related subjects.




## Academic Integrity

Students are expected to maintain the highest standards of academic integrity. All work submitted must be original and properly cited. Plagiarism, cheating, or any form of academic dishonesty will result in immediate consequences as outlined in the university's academic integrity policy.


Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. [Review Georgia Tech's Honor Code](https://catalog.gatech.edu/policies/honor-code/)  (<https://catalog.gatech.edu/policies/honor-code/>) and the [student Code of Conduct](https://catalog.gatech.edu/rules/18/)  (<https://catalog.gatech.edu/rules/18/>).

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

## Core IMPACTS

[Core IMPACTS](https://www.usg.edu/curriculum/core-impacts/)  (<https://www.usg.edu/curriculum/core-impacts/>) is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated [career competencies](https://www.usg.edu/curriculum/core-impacts/career_competencies/)  ([https://www.usg.edu/curriculum/core-impacts/career\\_competencies/](https://www.usg.edu/curriculum/core-impacts/career_competencies/)). [This resource](https://cetloe.gsu.edu/learning-design-services/constructing-a-syllabus/#core-impacts-requirements)  (<https://cetloe.gsu.edu/learning-design-services/constructing-a-syllabus/#core-impacts-requirements>) developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

## Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, [contact the Office of Disability Services](http://disabilityservices.gatech.edu/)  (<http://disabilityservices.gatech.edu/>) (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

## Student-Faculty Expectations Agreement (**Acceptable student conduct Statement**)

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. [The Student-](#)

**Faculty Expectations** [\(http://www.catalog.gatech.edu/rules/22/\)](http://www.catalog.gatech.edu/rules/22/) articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

## Useful References and Texts

There is no textbook required for this course. The course material comes primarily from course notes and a selection of recent papers on advanced Internet computing systems and application development and related research issues. However, there may be text books that you will find useful. A collection of papers and open access books will be provided at the course website from Canvas.




## Useful Reference TextBooks (Not Required)

- **Building Secure and Reliable Network Applications** [↗](http://www.amazon.com/exec/obidos/ASIN/1884777295/qid=965867153/sr=1-1/102-7075309-9529766)  
(<http://www.amazon.com/exec/obidos/ASIN/1884777295/qid=965867153/sr=1-1/102-7075309-9529766>), **Prof. Kenneth P. Birman** [↗](https://www.cs.cornell.edu/ken) (<https://www.cs.cornell.edu/ken>) Manning Pub. Co. 1996, Hardbound, 591 pages, ISBN 0137195842. It can be ordered from Follett DirectNet, 1-800-621-4088.
- **Understanding Search Engines: Mathematical Modeling and Text Retrieval (Software, Environments, and Tools)** [↗](http://www.amazon.com/exec/obidos/ASIN/0898714370/ref=cm_mp_wl/102-7075309-9529766?colid=3J8NNJ10YU5O4)  
([http://www.amazon.com/exec/obidos/ASIN/0898714370/ref=cm\\_mp\\_wl/102-7075309-9529766?colid=3J8NNJ10YU5O4](http://www.amazon.com/exec/obidos/ASIN/0898714370/ref=cm_mp_wl/102-7075309-9529766?colid=3J8NNJ10YU5O4)), Michael W. Berry and Murray Browne.
- **Modern Information Retrieval** [↗](http://www.amazon.com/exec/obidos/ASIN/020139829X/o/qid=966447906/sr=2-1/102-7075309-9529766)  
(<http://www.amazon.com/exec/obidos/ASIN/020139829X/o/qid=966447906/sr=2-1/102-7075309-9529766>), Berthier Ribeiro-Neto, Ricardo Baeza-Yates (ACM Press Series) May 1999. Addison-Wesley Pub Co; ISBN: 020139829X.
- **The Developer's Guide to the Java(tm) Web Server(tm): Building Effective and Scalable SeverSide Applications** [↗](http://www.amazon.com/exec/obidos/ASIN/020137949X/o/qid=966441348/sr=2-2/102-7075309-9529766)  
(<http://www.amazon.com/exec/obidos/ASIN/020137949X/o/qid=966441348/sr=2-2/102-7075309-9529766>), Dan Woods, Larne Pekowsky, Tom Snee, and Connie Welss
- **Web Server Technology** [↗](http://www.amazon.com/exec/obidos/ASIN/155860376X/102-7075309-9529766)  
(<http://www.amazon.com/exec/obidos/ASIN/155860376X/102-7075309-9529766>), Nancy J. Yeager and Robert E. McGrath, Morgan Kaufmann Publishers, 1996.
- **Web Proxy Servers** [↗](http://www.amazon.com/exec/obidos/ASIN/0136806120/102-7075309-9529766)  
(<http://www.amazon.com/exec/obidos/ASIN/0136806120/102-7075309-9529766>), Ari Luotonen, Prentice Hall, 1998
- **The Grid: Blueprint for a New Computing Infrastructure** [↗](http://www.amazon.com/exec/obidos/ASIN/1558604758/102-7075309-9529766)  
(<http://www.amazon.com/exec/obidos/ASIN/1558604758/102-7075309-9529766>), Edited by Ian Foster and Carl Kesselman, Morgan Kaufmann Publishers, 1998.

## Useful and Related Links

### Writing and Presentation Style:

- **The Elements of Style** [↗](http://www.bartleby.com/141)  
(<http://www.bartleby.com/141>)

- [Advice on Research and Writing](http://www.cs.cmu.edu/afs/cs.cmu.edu/user/mleone/web/how-to.html)  (<http://www.cs.cmu.edu/afs/cs.cmu.edu/user/mleone/web/how-to.html>)
- [How to write a great research paper](https://www.microsoft.com/en-us/research/academic-program/write-great-research-paper)  (<https://www.microsoft.com/en-us/research/academic-program/write-great-research-paper>) by Simon Peyton Jones
- [How to Increase the Chances Your Paper is Accepted at ACM SIGCOM](http://ccr.sigcomm.org/archive/1998/jul98/ccr-9807-partridge.pdf)  (<http://ccr.sigcomm.org/archive/1998/jul98/ccr-9807-partridge.pdf>) by Craig Partridge

## Internet Resources and Tools

- [Internet Traffic Report \(World Wide\)](http://www.internettrafficreport.com/)  (<http://www.internettrafficreport.com/>)
- [The Internet Archive](http://www.archive.org/)  (<http://www.archive.org/>)
- [The World Wide Web History Project](http://www.webhistory.org/home.html)  (<http://www.webhistory.org/home.html>)
- [Z39.50 and the World Wide Web](http://www.dlib.org/dlib/march96/briefings/03indexdata.html)  (<http://www.dlib.org/dlib/march96/briefings/03indexdata.html>)
- [An Internet Encyclopedia \(Third Edition\)](http://www.freesoft.org/CIE/index.htm)  (<http://www.freesoft.org/CIE/index.htm>)
- [Internet Statistics Growth and Usage of the Web and the Internet](http://www.mit.edu/people/mkgray/net)  (<http://www.mit.edu/people/mkgray/net>)
- [Search Engine Watch](http://www.searchenginewatch.com/)  (<http://www.searchenginewatch.com/>)
- [Computing Research Repository \(CoRR\)](http://arxiv.org/archive/cs/intro.html)  (<http://arxiv.org/archive/cs/intro.html>)