ITMO 544 Cloud Computing Technologies

ILLINOIS TECH | College of Computing

Semester: Fall 2022 Professor Jeremy Hajek

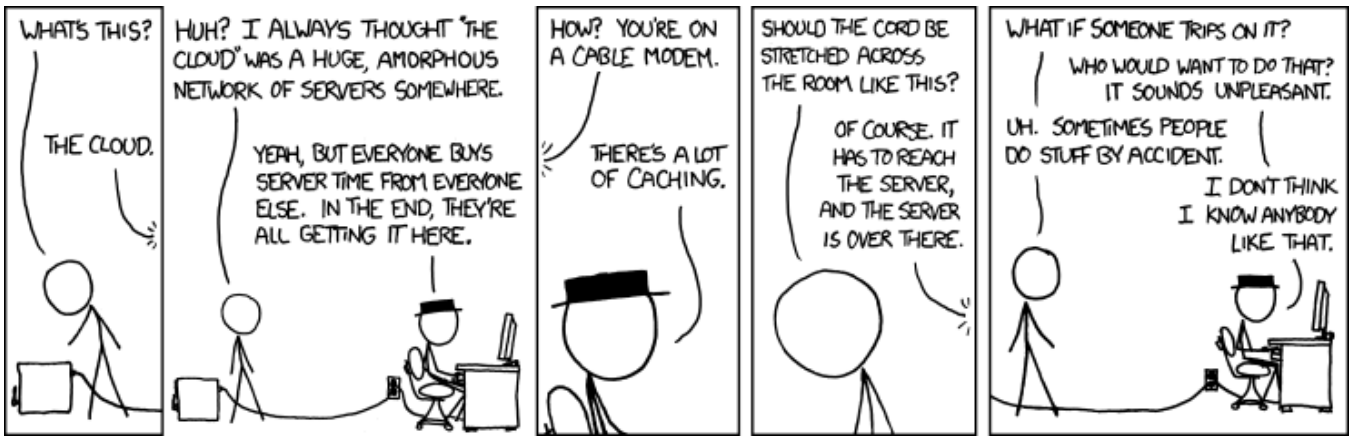

Figure 1: *https://xkcd.com/908*

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Online:	Book and appointment at: https://hajek.youcanbook.me

Course Catalog Description: Computing applications hosted on dynamically-scaled virtual resources available as services are considered. Collaborative and non-collaborative "cloud-resident" applications are analyzed with respect to cost, device/location independence, scalability, reliability, security, and sustainability. Commercial and local cloud architectures are examined. A group-based integration of course topics will result in a project employing various cloud computing technologies. ITMO 544 Bulletin Description

Prerequisites: ITMO 556 & ITMD 510 or ITMD 514, Credit: Lab 3-0-3

Lecture Day, Time & Place: Monday and Wednesday 3:15 pm - 4:30 pm in Tech South Smart Lab, TS-2030 on IIT's Mies Campus in Chicago.

Smart Lab Location To get to the Smart Tech Lab - enter the IIT tower on 35th Street. Swipe in at the desk and take the elevator up to the second floor. Exit to the left and head north over the bridge from the Tower to the TS building. The Floor turns from white tile to brown carpet. Take a left at the intersection and the Smart Lab is directly ahead of you.

Schedule of Topics/Readings: All readings should be done prior to class. Do the readings!

Session #	Date	Topic	Reading
1	08/22	Introduction	NA
2	08/24	Tooling Setup	NA
3	08/29	Tooling Setup	NA

Session #	Date	Topic	Reading
4	08/31	Tooling Setup	~~Practice of Cloud System Admin 1~~
5	09/05	Labor Day No class	NA
6	09/07	History of Cloud Computing & Lab 1	Practice of Cloud System Admin Pre-face and 1
7	09/12	Chapter 1	Practice of Cloud System Admin 2
8	09/14	Lab 2	NA
9	09/19	Chapter 2	Practice of Cloud System Admin 3
10	09/21	Lab 3	NA
11	09/26	Chapter 3	Practice of Cloud System Admin 4
12	09/28	Lab 4	NA
13	10/03	Chapter 4	Practice of Cloud System Admin 5, 6
14	10/05	Chapter 5, 6	NA
15	10/10	NA	No Class - Fall Break
16	10/13	NA	Midterm Exam
17	10/17	Lab 4	-
18	10/19	Lab 4	-
19	10/24	Lab 5	-
20	10/26	Lab 5	Mini Project 1 Assigned
21	10/31	Mini Project 1	-
22	11/02	Mini Project 1	MP1 Due MP2 Assigned
23	11/07	Mini Project 2	-
24	11/09	Mini Project 2	-
25	11/14	Mini Project 2	MP2 Due
26	11/16	Mini Project 2	-
27	11/21	Final Project	Final project Assigned
28	11/23	NA	Thanksgiving Break - No Class
29	11/28	Final Project	-
30	11/30	Final Project	Final Project Due
31	12/5-11	Final Exam week - TBA	

Course Outcomes:

Each successful student will be able to demonstrate building and running cloud-based services on a large scale. They will gain the knowledge of deploying and managing elastic and cloud-based applications on industry standard platforms as well as opensource platforms. Students will be prepared with knowledge of Cloud Based Operations and Application Development.

Course Student Outcomes: Students completing this course will be able to:

- Explain, document, and implement the fundamental aspects of IaaS, PaaS, SaaS
- Use and administer industry standard cloud resources
- Correctly identify cloud native operations and development methodologies
- Build and deploy elastic scaling applications on a cloud platform
- Design applications using a cloud native architecture
- Describe and employ web technologies for software deployment

Topics to Be Covered:

- How to think “Cloud Native”
- How to design cloud native systems for a distributed world
- Designing for Operations & Service Platforms

- AWS Introduction
- History of Cloud Computing
- Application Architectures
- Design Patterns for Scaling
- Design Patterns for Resiliency
- Operations in a Distributed World
- Cloud Concepts w/AWS
- Design Documents & Monitoring

Required Textbook:

The Practice of Cloud System Administration: Designing and Operating Large Distributed Systems, Volume 2, Thomas A. Limoncelli, Strata R. Chalup and Christina J. Hogan, 2014. ISBN: 978-0321943187

You will be using an existing or creating an account at Amazon Web Services. This will require a Credit Card for registration purposes – but there won't be any extra cost.

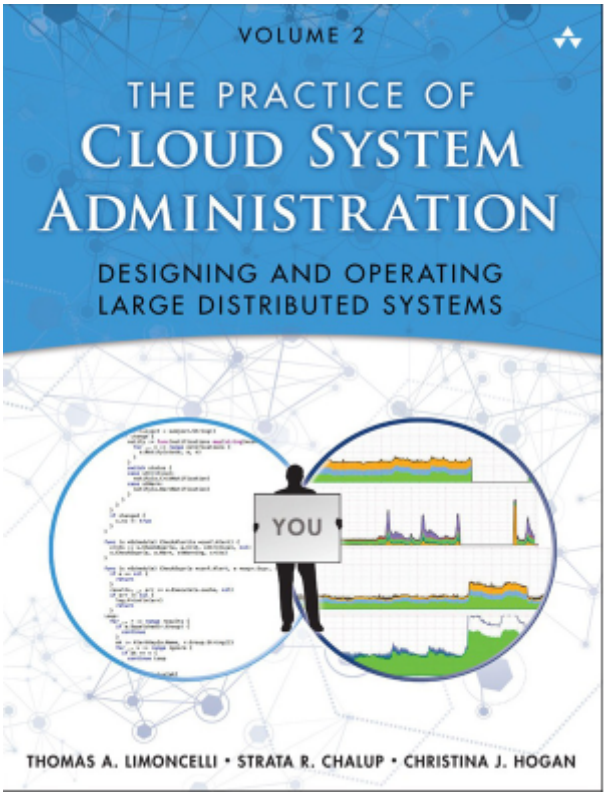

Figure 2: *Cloud Computing Technologies Textbook*

Readings: Readings for the class will be assigned from the textbooks; there will be additional reading assigned in the form of online reading. All readings should be done before coming to class on the assigned date, and are mandatory and expected. Generally if you do the readings you will excel in the course, as the lectures serve as a clarification and explanation of material you should al-ready be familiar with. Completion of reading may be verified by quizzes. Specific readings are assigned by topic above.

Course Notes: It is recommended to take notes from the oral discussion portion of the class.

Attendance: Undergrad attendance is expected and will be counted as part of your grade.

Course Web Site: http://blackboard.iit.edu/

Blackboard: The course will make intensive use of Blackboard http://blackboard.iit.edu/ for communications, assignment submissions, group project coordination, providing online resources and administering examinations. All remote students will view the course lectures online via Blackboard, and online readings and other course material will be found on Blackboard.

Assignments:

Project/Examination: There will be 6 chapter review questions, 6 graded labs, 3 Mini Projects, 1 Final project, and 1 Mid-term.

All Work will be pushed to a GitHub private repository that you will be given access to by the professor.

Grading: Grading criteria for students will be as follows:

Letter	Description	Percentage
A	Outstanding work reflecting substantial effort	90-100%
B	Adequate work fully meeting that expected of a graduate student	80-89.99%
C	Weak but marginally satisfactory work not fully meeting expectations	65-79.99%
E	Unsatisfactory work	0-64.99%

The final grade for the class will be calculated as follows:

Name	Grade	Total Points
Review Questions (6):	15%	120
Lab (6):	15%	120
Midterm Exam:	13%	100
MP1:	13%	100
MP2:	13%	100
MP3:	13%	100
Final Project:	13%	100
Attendance:	5%	30

Late Submission: By default no late work will be accepted – barring situations beyond our control.

Academic Honesty: All work you submit in this course must be your own.

Plagiarism: You must fully attribute all material directly quoted in papers and you must document all sources used in the preparation of the paper using complete, APA-style bibliographic entries. Including directly quoted material in an assignment without attribution or a bibliography entry for the source of the material is always plagiarism and will always be treated as such by me. No more than thirty-three percent of material included in any paper may be direct quotes. Students have submitted plagiarized material in seven of the last eight times I have taught this course and I will not tolerate it. If you submit plagiarized material you WILL receive a grade of ZERO for the assignment or exam question, an Academic Honesty Violation Report will be filed, and it may result in your expulsion from the course with a failing grade as per the IIT and ITM academic honesty policies. There is no excuse for not understanding this policy and if you do not understand it please let me know and I will be happy to discuss it with you until you do.

Collaboration: Students may only collaborate on assignments or projects that are explicitly designated as group assignments or projects. Students submitting work that is identical or in some cases even substantively the same will be asked to discuss the assignment with me. If one student admits to having copied the work, or if there is clear evidence who is guilty, the guilty student will be assigned a grade of zero. If no one admits to the offense or a reasonable determination of guilt cannot be made, each student involved will be assigned a grade of zero. In either case, an Academic Honesty Violation Report will be filed, and it may result in your expulsion from the course with a failing grade as per the IIT and ITM academic honesty policies.

Our Contract: This syllabus is my contract with you as to what I will deliver and what I expect from you. If I change the syllabus, I will issue a revised version of the syllabus; the latest version will always be available on Blackboard. Revisions to readings and assignments will be communicated via Blackboard.

Disabilities: Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Center for Disability Resources and make

an appointment to speak with me as soon as possible. My office hours are listed on the first page of the syllabus. The Center for Disability Resources (CDR) is located in 3424 S. State St., room 1C3-2 (on the first floor), telephone 312 567.5744 or disabilities@iit.edu.

ARC Tutoring Center: The university provides a free tutoring and study center called the ARC. This is located newly in the basement of the Galvin Library and is open to all for walk in appointments as well as scheduled tutoring.

Illinois Tech's Sexual Harassment and Discrimination Information: Illinois Tech prohibits all sexual harassment, sexual misconduct, and gender discrimination by any member of our community. This includes harassment among students, staff, or faculty. Sexual harassment of a student by a faculty member or sexual harassment of an employee by a supervisor is particularly serious. Such conduct may easily create an intimidating, hostile, or offensive environment.

Illinois Tech encourages anyone experiencing sexual harassment or sexual misconduct to speak with the Office of Title IX Compliance for information on support options and the resolution process. You can report sexual harassment electronically at iit.edu/incident report, which may be completed anonymously. You may additionally report by contacting the Title IX Coordinator, Virginia Foster at foster@iit.edu or the Deputy Title IX Coordinator at eespeland@iit.edu.

For confidential support, you may reach Illinois Tech's Confidential Advisor at (773) 907-1062. You can also contact a licensed practitioner in Illinois Tech's Student Health and Wellness Center at student.health@iit.edu or (312)567-7550

For a comprehensive list of resources regarding counseling services, medical assistance, legal assistance and visa and immigration services, you can visit the Office of Title IX Compliance website at https://www.iit.edu/title-ix/resources.