CS 643 Fall 2023 - Syllabus

Faculty Contact Information

Instructor: Anil Nadiminti

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Virtual Classroom Hours: WebEx Tuesday 7-8 P.M. ET

WebEx Link for classroom: https://njit.webex.com/njit/j.php?MTID=mfca22aec497c2fdd261eb6ae99edb0f6

Short Description

The course presents a comprehensive view of cloud computing, from platforms and services to programming and infrastructure. We'll explore topics like the advantages of cloud computing, the services offered by major providers like Amazon Web Services (AWS), Google Cloud, and Microsoft Azure; The course will introduce students to various services available from Cloud providers; We will use AWS as the Cloud Provider to learn about the service offerings, programming labs and understanding the cloud concepts. The course will also introduce the students to virtualization, storage, networking and containerization.

The course includes Hands-on Labs, AWS Topic presentation, research paper or Whitepapers presentations.

Learning Outcomes

Upon the successful completion of this course, the student should be able to:

- Analyze the trade-offs between deploying applications in the cloud and over local infrastructure
- Compare the advantages and disadvantages of different types of cloud platforms
- Deploy applications over Public cloud platforms
- Hands-on lab work to accelerate your knowledge about services that Public Cloud providers offer
- Analyze the performance, scalability, and availability of the cloud systems and applications
- Learn about Cloud services and Identify security and privacy issues in the cloud
- Collaborate to present state-of-the-art cloud research papers and Whitepapers

Why Take This Course?

Cloud computing represents a major paradigm shift in computing from the era of personal computers to the era of computing as utility. Most major Internet services are already deployed in the "the cloud." We store most of our data in "the cloud" and execute most applications from "the cloud." This course is aimed at all graduate students (both M.S. and Ph.D. students) who want to learn how to design and program cloud services and applications as well as how to build and administer cloud systems. By studying real-world systems developed in industry, students will acquire cutting-edge knowledge that may be a major advantage when searching for a job.

Lectures and Readings

There is no book required for this class. The course will include material from AWS Academy. The slides for each lecture will be posted online in canvas. The records/lecture will be available via Canvas. The readings should be used as reference material to clarify and add details to lectures.

Exams:

- **Two Exams**: There will be two exams: a midterm and a final exam. Date for Final exam will be published by NJIT.
- **Closed Book**: Both exams are closed book, meaning there will be no access to materials during the test. This includes papers and notes.
- **Exam policy** : The exam will be conducted In-person at the NJIT campus.
- **Make-Up Exam**: In case you miss an exam, a make-up exam may be taken. However, this can only be done after providing written documentation to the Dean of Students. Be sure to follow the proper procedure if you miss an exam.

Homework

Hands-on Labs will be the homework assignments. Students are expected to follow along the hands-on lab and take screen-recording of the lab completion. Details of the instructions to record the lab will be provided. Homework will include quizzes about individual topics.

Programming Assignments

There will be an individual programming assignment.

Paper Presentations

Students will present individually one research paper or whitepaper during the semester. These papers cover state-of-the-art research in cloud computing. The video recordings of voice over slides will be uploaded in Canvas for the whole class to watch. The presentations must be uploaded in the week to which the papers are assigned. Extra-credit is available for asking good questions about the presentations.

Topic Presentation

Students will present individually about one AWS Service/Topic. The AWS Presentation covers services that are offered in cloud computing. The video recordings of presentation need to be uploaded students into Canvas for the whole class to watch.

Grading

- Midterm exam - 20%
- Final exam - 20%
- Hands-on Labs - 20%
- Cloud Topic Presentation - 20%
- White paper presentation / Programming Assignment - 10%
- Topic quizzes / Knowledge Checks - 10%

Grading Scale

Grade	Percentile	Percentage
A	4.0	90.00-100.00%
B+	3.5	80.00-89.99%
B	3	65.00-79.99%
C+	2.5	58.00-64.99%

C	2	50.00-57.99%
F	N/A	0-49.99%

At the discretion of the instructors, the grading may be done on a curve.

Time Commitment

The students are expected to allocate 8-10 hours per week to study and work on the assignments for this course.

Submitting Assignments and homework:

In this course, we value punctuality and the commitment to meet deadlines. Assignments are expected to be submitted on or before their due dates. Any submission made after the specified deadline will incur a penalty. For each day of delay, points will be deducted from the assignment score. Therefore, it is crucial to manage your time effectively to ensure you maximize your performance in the course. Please take note of assignment deadlines and plan your work accordingly to avoid any unnecessary deductions. Your dedication to meeting these deadlines will contribute to your overall success in the course.

Recordings: The class will meet on Tuesday's from 7pm-8pm EST. Recording of the class will be posted to canvas.

Week	Date	Coursework
Week 1	**Sep 5**	**Cloud Foundations:** **Module 1 - Cloud Concepts Overview** **Module 2 - Cloud Economics and Billing**
Week 2	**Sep 12**	**Module 3 - AWS Global Infrastructure Overview** **Module 4 - AWS Cloud Security** **Module 5 - Networking and Content Delivery**
Week 3	**Sep 19**	**Module 6 - Compute**
Week 4	**Sep 26**	**Module 7 - Storage** **Module 8 - Databases**

Week 5	**Oct 3**	**Module 9 - Cloud Architecture** **Module 10 - Auto Scaling and Monitoring**
Week 6	**Oct 10**	**Cloud Developing:** **Module 2: Introduction to Developing on AWS** **Module 3: Developing Storage Solutions**
Week 7	~~**Oct 17**~~ **Oct 14 (Saturday 9am-12pm EST)**	**Mid-Term Exam (Cloud Foundations course content)**
Week 8	**Oct 24**	**Module 4: Securing Access to Cloud Resources** **Module 5: Developing Flexible NoSQL Solutions**
Week 9	**Oct 31**	**Module 6: Developing REST APIs**
Week 10	**Nov 7**	**AWS Topic presentation Due** **Module 7: Developing Event-Driven Serverless Solutions**
Week 11	**Nov 14**	**Module 8: Introducing Containers and Container Services**
Week 12	**Nov 21**	**Module 9: Caching Information for Scalability** **Module 10: Developing with Messaging Services**
Week 13	**Nov 28**	**Module 11: Defining Workflows to Orchestrate Functions**
Week 14	**Dec 5**	**Module 12: Developing Secure Applications on AWS**
Week 15	**Dec 12**	**Module 13: Automating Deployment Using CI/CD Pipelines**
Week 16	**Dec 17 - Dec 23**	Final exam week **(Cloud Developing course content)**

Academic Integrity

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at this link: **University Policy on Academic Integrity**.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at **dos@njit.edu.**