Northeastern University
College of Engineering

# CSYE 6225 Network Structures and Cloud Computing

## Course Information

Course Title: Network Structures and Cloud Computing
Course Number: CSYE 6225
Term and Year: Spring 2024
Credit Hour: 4
Course Format:

## Instructor Information

Full Name: Tejas Parikh
Email Address: t.parikh@northeastern.edu

## Course Prerequisites

Graduate Level CSYE 6200 Minimum Grade of C- or Graduate Level INFO 5100 Minimum Grade of C-

## Course Description

Offers a practical foundation in cloud computing and hands-on experience with the tools used in cloud computing. Designed as a foundation course for cloud-aware, adept professionals. Focuses on the fundamentals of cloud computing, the principal areas of cloud architectures, cloud security, cloud governance, cloud storage, cloud virtualization, and cloud capacity. Discusses the Internet evolution that led to cloud and how cloud applications revolutionized Web applications.

## Standard Learning Outcomes

*Learning outcomes common to all College of Engineering Graduate programs:*

1. *An ability to identify, formulate, and solve complex engineering problems.*
2. *An ability to explain and apply engineering design principles, as appropriate to the program's educational objectives.*
3. *An ability to produce solutions that meet specified end-user needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.*

*The Information Systems Program accepts students of different engineering backgrounds with minimum programming skills and produces first class Information Systems engineers that operate at the intersection of real-world complexity, software development, and IT management. Graduating students will be able to construct end-to-end advanced software applications that meet business needs.*

*Specific Learning Outcomes for the Information Systems program:*

1. *Create a strong technical foundation through diverse, high-level courses*
2. *Built crucial interpersonal skills needed to succeed in any industry*
3. *Foster a deep level of applied learning through project based case studies*

## Course Outcomes and Assesment Standards

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

1. Understand basic concepts related to cloud computing.
2. Understand cloud architecture and different cloud models such as IaaS, PaaS & SaaS.
3. Obtain hands on knowledge about Linux system administration and networking fundamentals.
4. Compare different cloud platform providers such as Amazon Web Services (AWS), Microsoft Azure and Google Cloud Platform.
5. Understand cloud storage options such a file storage, CDNs, Relational Databases, NoSQL databases, etc.
6. Learn to develop scalable applications using various AWS features such as auto scaling and load balancing.
7. Learn to secure applications using SSL and protect user data against attacks such as XSS, CSRF and SQL injection.
8. Hands on experience with microservices & APIs.
9. Have understanding of Agile development, Git version control system, Continuous Integration and Deployment using tools like TravisCI.
10. High level understanding of DevOps and Site Reliability Engineer (SRE) role.

### *Topics Covered*

(Tentative) List of topics covered in this course:

- DevOps, GitOps, SRE
- Linux, Shell Scripting
- Version Control with Git
- Computer Networking
- Cloud Computing
- Microservices Architecture
- Identity & Access Management
- Infrastructure as Code
- Cloud Storage Solutions
- Continuous Integration, Continuous Delivery, and Continuous Deployment
- Operational Visibility (Logging, Metrics, Monitoring, and Alerting)
- Load Balancers
- Auto-scaling Applications
- Event-driven Architecture
- Serverless Computing
- Securing cloud applications and infrastructure

## Course Logistics

| CRN | Section # | Building & Room # | Campus | Time | Day |
|---|---|---|---|---|---|
| 15214 | 01 | West Village F 020 | Boston | 6:00pm-9:30pm | Thursday |
| 15279 | 05 | - | Online | - | - |

## Schedule

Course schedule can be found on the course website. Schedule will be posted a couple of weeks before the start of the semester.

## Important Dates

Please review the appropriate A cademic Calendar for important Graduate School dates for the current and upcoming semesters

## Attendance

You are expected to regularly attend lectures. Lecture attendance will be taken using Qwickly Attendance however there are no grades for attendance.

## Online Course - Accessing Course Lectures

Lectures are recorded during the Boston campus's class. Details on accessing the course lecture will be provided during the first lecture. Lecture recordings are not available to students enrolled in the Boston campus section of the course.

## Textbooks & Required Readings

There are no required textbooks for this course. Reference material will be posted on the course website.

## Required Tools & Software

Details about required tools and software will be posted on the course website. Students are solely responsible for cost to acquire tools listed below. Northeastern University, College of Engineering and the instructor will not be responsible for any charges incurred. Signups with cloud service providers might require a valid credit or debit card even for free tiers.

## Assignments

Students will be assigned 8-10 assignments throughout the semester. Individual assignment weightage on course grade and due date will be announced when assignments are handed out. As each assignment will build on top of previous assignments, it is important that you complete all assignments on time. All assignments will be individual assignments.

## Grading

To learn the material of the course you are expected to attend class and actively participate in group exercises and help your peers by answering their questions on group discussion.

Course grades will be based on assignments, midterm, & final exam, and presentation of your group project.

Midterm and Final exams must be taken at the time and location determined by the schedule and announced in class. Make up exams will be permitted only for exceptional circumstances in accordance with NEU policy.

## Late work policy

Assignments and grading are expected to be completed by their respective due date. For every day the assignment is late after the assignment or the grading due date, points will be deducted as follows:

| **Late** | **Deduction** |
|---|---|
| One day (24 hrs) | 10% |
| Two days (48 hrs) | 25% |
| More than two days and less than seven days | 50% |
| More than seven days | 100% |

## Method of Evaluation

Grading will be based on an absolute grading system. In this grading system, a range of point values is assigned to a letter grade. The grading is absolute, irrespective of the grade of other students in the class. I do not round scores to the closest percentage. More details will be posted on the course website.

| **Activity** | **Percentage** |
|---|---|
| Assignments | 70% |
| Mid Term Exam | 15% |
| Final Exam | 15% |

## Pass/Fail Grade

If a student elects to receive Pass/Fail for the course instead of letter grade, following grading criteria will apply:

| Category | Min. Percentage |
|---|---|
| MidTerm Exam | 84% |
| Final Exam | 84% |
| Assignments | 84% |

Students must score 84% or higher in each of the categories listed above to receive S grade. Failure to score a minimum of 84% in any category will result in U grade.

## End-of-Course Evaluation Surveys

Your feedback regarding your educational experience in this class is very important to the College of Professional Studies. Your comments will make a difference in the future planning and presentation of our curriculum.

At the end of this course, please take the time to complete the evaluation survey at **https://neu.evaluationkit.com**. Your survey responses are **completely anonymous and confidential**. For courses 6 weeks in length or shorter, surveys will be open one week prior to the end of the courses; for courses greater than 6 weeks in length, surveys will be open for two weeks. An email will be sent to your HuskyMail account notifying you when surveys are available.

## Academic Integrity

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to http://www.northeastern.edu/osccr/academic-integrity-policy/ to access the full academic integrity policy.

## Student Accommodations

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability.

For more information, visit http://www.northeastern.edu/drc/getting-started-with-the-drc/.

## Library Services

The Northeastern University Library is at the hub of campus intellectual life. Resources include over 900,000 print volumes, 206,500 e-books, and 70,225 electronic journals.

For more information and for Education specific resources, visit http://subjectguides.lib.neu.edu/edresearch.

## 24/7 Blackboard Technical Help

For immediate technical support for Blackboard, call 617-373-4357 or emailhelp@northeastern.edu

Within Blackboard, open a support case via the red support button on the right side of the screen, click Create Case

myNortheastern, e-mail, and basic technical support
Visit the Information Technology Services (ITS) Support Portal
Email: help@northeastern.edu
ITS Customer Service Desk: 617-373-4357

## Diversity and Inclusion

Northeastern University is committed to equal opportunity, affirmative action, diversity and social justice while building a climate of inclusion on and beyond campus. In the classroom, member of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration and an awareness of global perspectives on social justice.

Please visit http://www.northeastern.edu/oidi/ for complete information on Diversity and Inclusion

## TITLE IX

*Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.*

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty and staff.

In case of an emergency, please call 911.

***Please visit www.northeastern.edu/titleix for a complete list of reporting options and resources both on- and off-campus.***