

# IoT-Edge-Cloud Continuum

## Syllabus

### Overview

**Instructor:** Mohsen Amini Salehi

**Office:** F297B

**Teaching Assistant:** N/A.

**Course Format:** In Person

**Class hours:** Tue-Thur 12:15—1:35pm

**Office hours:** Tuesdays 10am—12pm and Thursdays 1:30—3pm

**Email:** [mohsen.aminisalehi@unt.edu](mailto:mohsen.aminisalehi@unt.edu)

**Zoom Link:** <https://unt.zoom.us/j/5928241566> (in case needed)

### Course Description

This course is on the fundamentals of modern Cloud Computing systems and techniques to work with them and developing applications for them. This course will provide students with knowledge of Cloud Computing Architecture, Cloud Programming, Cloud Edge Interactions, and finally Cloud+AI in modern Edge-Cloud systems.

This course is for all graduate students in the CSE department, including Computer Science and Computer Engineering, AI, etc. Senior undergraduate students can also take the course.

**Prerequisites:** Knowledge of Computer networks and operating systems will help!

Total credit hours: **3**

### Course Outcomes

- (A) Be proficient in the fundamentals of distributed systems and clouds. Learning emerging applications of cloud computing.
- (B) Implementing programming models in distributed systems and clouds.
- (C) Learning the architecture and resource management structure in cloud.
- (D) Ability to implement edge-cloud solutions based on elasticity and multi-tenancy.

### Materials for the Course

- Reference Book: *Distributed and Cloud Computing from Parallel Processing to the Internet of Things*
  - Author: Kai Hwang
  - [Link to purchase online](#) (not necessary to purchase! Available in the Library)
- Other online resources (e.g., YouTube Tutorials)

## Method of Instruction

- Writing on the board, Illustration through PowerPoint slides, Regular class interaction, Problem solving through assignments, Research on advanced aspects of cloud computing in academia and industry.
- Taking part in the classes is not compulsory. However, students are responsible for all missed work, or any announcements in the class. The absence reason could be anything including university sponsored events.
- **Note:** Lecture notes and handouts will be available on Canvas. Examples written on the whiteboard will NOT be available on Canvas. Therefore, it is the student's responsibility to attend lectures and take notes.

## Assessment and Grading Policy

### Mark Breakdown:

- **Team works**
  - **Semester-long Project: 50%**
- **Individual Assignments: 35%**

Assignments will be on Scheduling, Distributed programming, Building Cloud-based solutions, and a Research presentation+Demo.

Assignments must be turned in on their due dates. Late submissions may be allowed up to 24 hours after the due date with a 20% penalty on the grade for that assignment. After 24 hours, the assignment will not be accepted and will receive a zero. Technical issues (e.g., internet outage, computer crash) are not valid excuses; plan ahead
- **Quizzes: 15%**
- **In-class activities.** These activities generally have bonus points. Due to the *ad hoc* nature of the in-class activities, they will be announced during class time. It is your responsibility to listen to class carefully to learn about these activities. If you are absent, you will miss the in-class activities and their bonus points. No late submissions or make-up will be accepted for class activities.
  - **Note 1:** There is **just 1 week to question any assignment or test grades.**
  - **Note 2:** In grading team-based assignments, peer evaluations from team-mates are considered and the grades will be scaled accordingly. That means, team members won't necessarily get the same grade.
  - **Note 3:** Group project best practices:
    - Speak up and volunteer – "my team didn't give me work" is not an excuse
    - Every member must participate in coding and development
    - Failure to participate in coding = 0 for project grade
    - Contact the instructor early if team issues arise

## Project Guidelines

The project must have appropriate scope for 2 team members over the term; and have a Graphical User Interface (GUI).

The project can:

- Be done in a language of your choosing (approval required if other than C/C++, C#, Python, Java, JavaScript)
- Be web-based or mobile app (you supply your own hardware)

The project must not:

- Be trivial (no simple calculators or to-do lists)
- Be static web pages or screens
- Already exists (no cloning existing repositories)
- Harm the safety, security, or privacy of users
- Be primarily used by minors

## Course Grading Scale

| Grade | Scale     |
|-------|-----------|
| A     | 90 to 100 |
| B     | 80 to 89  |
| C     | 70 to 79  |
| D     | 60 to 69  |
| F     | 0 to 59   |

## Communication Expectations

All course-related announcements will be on Canvas. Please set up your notification settings to avoid missing any announcements.

- Email is the primary way to contact me.
- Expect a reply within 24 hours on weekdays.
- Keep messages short and clear. No need for overly formal AI-generated text.

## Make-up Work Policy

For most situations there will be no make-up work for any assessment on this course. However, in the event of an unavoidable absence for one of the reasons below, email me as soon as possible so we can work out a solution. The following events are grounds for make-up work: being a participant in a conference in which you are presenting; being in an athletic or other UNT associated event in which you are an active participant; a documented family emergency; a severe illness (with doctor excuse note); military duty (must be documented);

or in certain cases and with some restrictions a religious event (must be documented). Additionally, in the case of a missed assignment due to illness, make-up work will only be allowed by the instructor to receive further notification from the Dean of Students. Students are responsible for sending an email to the Dean of Students with a physical copy of a signed doctor's note. See the [UNT Attendance Policy](#) for more information.

A student is responsible for requesting an excused absence in writing, providing satisfactory evidence to the Dean of Students ([deanofstudents@unt.edu](mailto:deanofstudents@unt.edu)) to substantiate excused absence, and the Dean of Students will send the notification to the faculty member assigned to the course for which the student will be absent. When an absence is excused, the faculty member will provide a reasonable time after the absence for the student to complete the assignment.

## **AI Usage Policy**

AI tools (GitHub Copilot, Claude, ChatGPT, etc.) are encouraged as development aids and must be cited using code comments. You must understand and be able to explain all submitted code. Include AI usage in your status reports. AI cannot be used for peer evaluations or reflection writing.

The goal is to become an AI-augmented engineer, not AI-dependent. Uncited AI use or submitting AI-generated code without understanding constitutes academic dishonesty.

## **Academic Dishonesty/Plagiarism**

Students must follow the UNT Policy on Student Academic Integrity (Policy 06.003) and the CSE Department Cheating Policy. Academic dishonesty — including cheating, plagiarism, unauthorized collaboration, or using prohibited materials — will result in a failing grade for the course and a report to the Office of Academic Integrity.

## **Student Perceptions of Teaching (SPOT)**

SPOT is your opportunity to provide feedback on this course and instructor. It will be available near the end of the semester. Your responses help improve teaching and learning at UNT.

## **Syllabus Revisions**

This syllabus may be modified as the course progresses should the instructor deem it necessary.

## **Disability Accommodation**

The University of North Texas complies with Section 504 of the 1973 Rehabilitation Act and with the Americans with Disabilities Act of 1990. The University of North Texas provides academic adjustments and auxiliary aids to individuals with disabilities, as defined under the law. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring accommodation, please see the

instructor and/or contact the Office of Disability Accommodation at 940-565-4323 during the first week of class.

## Course Outline and Organization of Lectures

### **Module 1**

- From Distributed Systems to Cloud and Edge Computing (Week 1)

### **Module 2**

- Cloud Virtualization and Containers (Weeks 2—3)
- Project Proposal defense (Week 4)

### **Module 3**

- MPI Programming (Week 5)

### **Module 4**

- Web Services (Week 6)

### **Module 5**

- RPC (GRPC) (Week 7)
- Midterm Project presentation (week 8)

### **Module 6**

- Serverless Computing and Function as a Service (FaaS) (Week 9)

### **Module 7**

- Message Queue (Week 10)

### **Module 8**

- Edge Computing (Week 11)

### **Module 9**

- AI across IoT-Edge-Cloud Continuum (Week 12)
- Research Presentation (Week 13)
- Final project presentation (Week 14)