Course Information

Course:	CIS 4930/5930 Future Edge Networks and Distributed Intelligence
Credit Hours:	3
Lecture Room:	James Jay Love Building, 101
Lecture Day/Times:	Tuesday, Thursday, 6:35 p.m. - 7:50 p.m.
Course Website:	https://xinliulab.github.io/FSU-CIS4930-CIS5930-Future-Edge-Networks/

Contact Information

Instructor:	Dr. Xin Liu
Email:	xliu15@fsu.edu
Office Hours:	Thursday, 3:30 p.m. - 5:30 p.m.
Office:	James Jay Love Building, 160
Teaching Assistants:	TBD tbd@fsu.edu

Course Objectives

- **Fundamental Goal: Applying AI/ML to 5G and Beyond**

  - **AI/ML for Wireless Networks:** Understand how modern machine learning, especially deep learning, can be used to improve the design and operation of 5G and beyond wireless systems.

  - **System-Level Thinking:** Connect networking principles with ML pipeline design, focusing on how learning components interact with real network constraints.

- **Core Focus: 5G/ORAN and Hybrid Routing Systems**

  - **5G Architecture and ORAN:** Learn the overall 5G network architecture with an emphasis on the Open Radio Access Network (ORAN), its key interfaces, and deployment considerations.

  - **Model Routing in Edge Environments:** Design mechanisms to select, place, and invoke ML models dynamically across the network, balancing latency, accuracy, and resource constraints.

  - **Hybrid Routing Design:** Study how model routing and network routing interact, and learn to build integrated systems that jointly optimize both.

- **Key Topics and Emphasis on Edge-Side Challenges**

  - **Edge Resource Constraints:** Analyze compute, memory, energy, and bandwidth limitations at the edge, and their implications for real-time ML inference and control.

  - **Wireless Fundamentals for Edge Intelligence:** Cover essential concepts such as OFDM and resource allocation, focusing on how they shape edge-side ML performance.

  - **Selective Coverage of the 5G Core:** Briefly introduce core-network concepts (e.g., slicing strategies) to provide context, while keeping the primary emphasis on edge-side challenges.

Course Prerequisites

While no prior experience with wireless systems is required, students should be comfortable with programming (**MatLab** and **Python** will be used frequently) and have a basic understanding of machine learning, including some hands-on experience with deep learning techniques.

Course Material

- **Textbook:** Editors: Afif Osseiran, José F. Monserrat, Patrick Marsch, 5G Mobile and Wireless Communications Technology.
  (Note: Free and legal electronic versions are available online.).

- **Slides and Codes:** Availabl edirectly on the course website.

Computer Accounts

- **GitHub Account:** You will need a GitHub account to access course assignments and use GitHub Codespaces.

- **GitHub Student Developer Pack:** It is strongly recommended to apply for the GitHub Student Developer Pack to access free credits for Codespaces and other developer tools.

- **FSU Email:** You will need a `my.fsu.edu` account for receiving class emails. For more information, visit: https://servicecenter.fsu.edu/s/article/Email-Account-Management-Information2.

Your Responsibilities

- Check the course website and your email account regularly

- Understand the lecture slides and reading assignments

- Uphold academic honesty in completing your assignments, projects, and exams

- Turn in your projects on time

- Attend office hours for extra help, as needed

Course Calendar

- For the most up-to-date course calendar, including lecture topics, assignment deadlines, and exam dates, please refer to the course website.

- In recitation sessions, the TAs will present materials pertaining to the course projects.

Course Evaluation and Grading Policies

- **In-Class Quizzes: 5%**

There will be several short in-class quizzes throughout the semester. These quizzes are primarily used to track attendance and encourage active participation.

- **Assignments: 15%**

There will be several homework assignments (written and coding-based) spaced out over the course of the semester. All assignments are equally weighted. Submission and other instructions will be posted on Canvas or GitHub.

- **Project Proposal & Presentation: 25%**

Students will complete a semester-long group project to solve a challenging real-world edge network problem.

(1) **Project Proposal (15%)** is due by 11:59 PM (ET) on 02/22/2026. The proposal is **strictly two pages maximum** for the main content; references and appendices may be of unlimited length. Supplementary materials (any type) are allowed up to 50 MB.

(2) **Proposal Presentation (10%)** will take place in the middle of the semester (dates subject to change depending on the number of groups). Each group will have **20 minutes** for presentation and **10 minutes** for Q&A.

Important policy for proposal presentation:

(1) **In-person presentation only.** No make-up or deferred presentations will be approved.

(2) Multiple time slots will be assigned for each class in random order among groups. Plan ahead when submitting your availability.

■ **Final Project Report & Presentation: 45%**

(1) **Final report and code (25%)** are due 23:59 (ET) on 04/27/2025. The final report is **strictly eight pages maximum** for the main content; references and appendices may be of unlimited length. Supplementary materials (any type) are allowed up to 50 MB. **Only Python or MATLAB** will be allowed for implementations.

(2) **Final presentation (20%)** will take place at the end of the semester (dates subject to change). Each group will have **20 minutes** for presentation and **10 minutes** for Q&A.

Important policy for final presentation:

(1) **In-person presentation only.** No make-up or deferred presentations will be approved.

(2) Multiple time slots will be assigned for each class in random order among groups. Plan ahead when submitting your availability.

Please see a detailed introduction of Project Proposal & Presentation and Final Project Report & Presentation on the course site.

■ **Final Exam: 10%**

The final exam will be held on Thursday, April 30, 2025, 5:30 p.m.–7:30 p.m. (ET). We will not have class for the whole week. All questions will be closely related to lecture content. Students may bring one A4-size one-page cheat sheet.
Important policy for the final exam:

(1) No make-up or deferred exams will be approved. In extreme cases, such requests must be approved in advance by the Dean's Office.

(2) The cheat sheet is **not allowed** in a make-up exam.

Extra Bonus.
Students are encouraged to prepare submissions to arXiv or major AI/ML/DM conferences based on their projects. Please make an appointment with the instructor prior to any submission plan for a comprehensive evaluation of the research topic. Each submission under the instructor's recognition will gain **7 points** on the final grade.
Letter grades are assigned based on the final percent using the cut-off values:

Grade	% bound
A	93 - 100
A-	90 - 92.9
B+	87 - 89.9
B	83 - 86.9
B-	80 - 82.9
C+	77 - 79.9
C	73 - 76.9
C-	70 - 72.9
D	60 - 69.9
F	<60

Course Policies, Support Services, and Other Information

Missed Exam Policy
Unexcused missed exams and homework will be given a grade of 0. See the University Attendance Policy for a discussion of valid reasons to excuse absences: `https://registrar.fsu.edu/bulletin/graduate/information/academic_regulations/`.

Grade of "I" Policy
Incomplete ("I") grades should be recorded only in exceptional cases when a student, who has completed a substantial portion of the course and who is otherwise passing, is unable to complete a well-defined portion of a course for reasons beyond the student's control. Students in these circumstances must petition the instructor and should be prepared to present documentation that substantiates their case.

University Attendance Policy
Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy
The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to "...be honest and truthful and...[to] strive for personal and institutional integrity at Florida State University." (`http://fda.fsu.edu/Academics/Academic-Honor-Policy`).
For this course, in particular, every student must complete his/her assignments, quizzes, and exams independently. Showing your work to your peers or making it accessible to them is considered academic dishonesty. You are responsible for ensuring that your work is adequately protected and not accessible to others.

Americans with Disabilities Act
Students with disabilities needing academic accommodation should:

1. Register with and provide documentation to the Student Disability Resource Center (SDRC).

2. Bring a letter to the instructor indicating the need for accommodation and the specific type required.

Please note that instructors cannot provide classroom accommodations until appropriate verification from the SDRC has been received. This syllabus and other class materials are available in alternative formats upon request.

For more information about services available to FSU students with disabilities, please contact the SDRC:

- Address: 874 Traditions Way, 108 Student Services Building, Florida State University, Tallahassee, FL 32306-4167

- Phone: (850) 644-9566 (voice), (850) 644-8504 (TDD)

- Email: sdrc@admin.fsu.edu

- Website: `http://www.disabilitycenter.fsu.edu`

Confidential Campus Resources

Various centers and programs are available to assist students with navigating stressors that might impact academic success. These include the following:

- **Victim Advocate Program:** University Center A, Room 4100, (850) 644-7161, Available 24/7/365, Office Hours: M-F 8-5, `https://dsst.fsu.edu/vap`

- **University Counseling Center:** Askew Student Life Center, 2nd Floor, 942 Learning Way, (850) 644-8255, `https://counseling.fsu.edu/`

- **University Health Services:** Health and Wellness Center, (850) 644-6230, `https://uhs.fsu.edu/`

Free Tutoring from FSU

On-campus tutoring and writing assistance are available for many courses at Florida State University. For more information, visit the Academic Center for Excellence (ACE) Tutoring Services' comprehensive list of on-campus tutoring options at `http://ace.fsu.edu/tutoring` or contact tutor@fsu.edu. High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

Late Policy and Make-up Exams

- Late assignments will not ordinarily be accepted. If, for some compelling reason, you cannot hand in an assignment on time, please contact the instructor as far in advance as possible.

- No credit will be given to late course projects.

- No make-up exams (except under extremely unusual circumstances).

Syllabus Change Policy

Except for changes that substantially affect the implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.