

UNIVERSITY OF WASHINGTON – ECE COURSE PROPOSAL

Master Course Description for Undergraduate Course EE 399 (?)

1. Basic Course Information:

- a. **Course Title:** Robotics Mentorship Practicum
- b. **Credits:** 1–2 (variable)
- c. **Grading System:** Credit/No Credit
- d. **First Effective Quarter:** Autumn 2026
- e. **Repeatability:** Yes – students can take EITHER just one quarter per year, or both Autumn or Winter quarter (up to 4 credits total recommended)
- f. **Delivery Mode:** Hybrid (asynchronous + community-based engagement)
- g. **Course Coordinator:** Rebecca Carlson (MSEd) – ECE PMP Staff

2. UW Course Catalog Description

Provides supervised experience mentoring middle and high school robotics teams in partnership with FIRST Washington. Students apply electrical and computer engineering principles in informal STEM learning environments. Develops communication, leadership, and inclusive mentoring practices. Includes structured reflection on community engagement and the societal impacts of engineering.

3. Course Overview/Goals:

This course provides a structured, community-engaged practicum in which students mentor FIRST Washington Robotics teams serving underserved grade 7-12 populations. The goal is for students to contribute technical expertise while supporting youth development in robotics design, programming, and competition participation. The course integrates:

- Technical application of ECE knowledge
- Community-engaged learning (CELE-aligned)
- Equity-focused STEM education
- Reflective practice

4. Learning Objectives

Upon successful completion, students will be able to:

Technical Application

- Apply engineering principles in real-world robotics mentoring contexts
- Support design, fabrication, and programming processes

Communication & Leadership

- Communicate technical concepts to non-expert audiences
- Demonstrate mentorship and leadership skills

Community Engagement

- Analyze inequities in STEM access and participation
- Practice inclusive and culturally responsive mentoring

Reflection & Professional Development

- Evaluate the societal role of engineering

- Reflect critically on community engagement experiences

5. Textbook Required: None

6. Prerequisites:

Prerequisites (Undergraduate Section):

- Minimum one ECE course in circuits, programming, robotics, or related field
- Junior or Senior standing in the ECE department

7. Course Structure

Weekly Commitment

- **1 credit:** 2 – 3 hours/week
- **2 credits:** 4 - 5 hours/week

Lecture Topics/Components

1. **Preparation & Training (Week 1)**
2. **Community-Based Mentorship (Weeks 2–9)**
3. **Reflection Activities (ongoing)**
4. **Final Reflection & Verification (Week 10)**

Weekly Outline:

Week	Topic	Activities
1	Preparation	Mentor training; youth safety certification
2	Placement	Team assignment; establish goals
3–4	Early Engagement	Begin mentoring; observation and support
5–6	Development	Lead small-group technical activities
7–8	Leadership	Increased responsibility; competition prep
9	Integration	Wrap-up and documentation
10	Reflection	Final paper and verification submission

8. Assignments & Evaluation

Component	Weight
Training Completion	10%
Goal Setting	10%
Reflection Assignments	30%
Community Engagement Participation	40%
Final Reflection Paper	10%

Required Deliverables

- Training completion
- Goal setting
- 3–4 reflection assignments
- Signed work-hours verification form by assigned team director

- Final reflection paper (2 pages)

9. Community Engagement Component (CELE Alignment)

This course qualifies for the **Community-Engaged Learning (E) designation** by incorporating:

- **Reciprocal Partnerships:** FIRST Washington Robotics & local schools
- **Community-Identified Need:** STEM mentorship in underserved communities
- **Structured Preparation:** Required mentor and safety training
- **Sustained Engagement:** Weekly placement (2.5–10 hrs/week)
- **Critical Reflection:** Guided written reflections
- **Partner Feedback:** Supervisor verification and evaluation

Once this course is approved by ECE, Rebecca will work with CELE to finalize designation.

10. Instructional Resources

- In person meeting for first meeting for training with FIRST Washington team.
- Asynchronous training modules – mentorship tips documents, UW Youth Safety training materials
- FIRST Robotics technical documentation
- Reflection prompts and discussion materials

ABET Student Outcome Coverage: This course addresses the following outcomes:

H = high relevance, M = medium relevance, L = low relevance to course.

(1) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. (H)

By acting as a technical mentor to middle and high school students, our students will leverage their problem solving and technical skills to help the students build robotics for competition.

(2) An ability to communicate effectively with a range of audiences (H)

One of the most important skills our students will develop through this mentorship experience is the ability to learn how to change their communication style to fit not only the skill level, but the age range of the middle or high school students they are working with. Students will learn both verbal and written communication skills through this experience.

(3) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions (M)

Students will be actively working with Robotics teams to troubleshoot technical problems, interpret data to analyze where issues are and leverage their technical expertise to provide sound technical mentorship.

11. Curricular Justification

Curricular Cohesion

This course will also be offered at the ECE graduate student level.

The course complements:

- Robotics, controls, and embedded systems coursework
- Capstone design experiences, including teamwork and communication skills
- Professional development and leadership training

Curricular Need

- Addresses a gap in **applied community-based engineering practice**
- Expands opportunities for **experiential and service-based learning**
- Supports demand for **STEM outreach and equity engagement**

Curricular Viability/Audience

- Strong alignment with existing FIRST Washington partnerships
- Low infrastructure cost (community-based delivery)
- Flexible format supports scalable enrollment
 - Students can either volunteer in person, or remotely (student choice)
- Target Audience is Junior and Seniors

Expected Enrollment

- 10 undergraduate students each quarter

Curricular Impact

- Minimal impact on existing courses – this would be an elective course
- Enhances student professional skill development
- Strengthens UW's community engagement mission – there is only one community engagement course in the entire College of Engineering currently

12. Relationship to Existing Courses

- Distinct from technical lecture courses—emphasizes applied mentorship

13. Implementation Plan

- Use the 2026-2027 as a pilot to test student interest
- Work with Undergraduate Advising to 'market' the class to current students.
- Collect enrollment and feedback data

14. Diversity, Equity, and Inclusion

The course advances equity by:

- Supporting underserved K–12 students
- Training students in inclusive teaching practices
- Encouraging reflection on systemic inequities in STEM

15. Additional Notes

- Eligible for **Community-Engaged Learning (E) designation**
- Flexible format supports multi-quarter enrollment
- Encouraged continuation for teams advancing to competitions (from Autumn to Winter quarter) – but not required