Bassel El Mabsout ◇ Teaching Statement

Teaching Vision

My teaching philosophy centers on empowering students to become independent problem-solvers by bridging theoretical foundations with hands-on applications. Drawing from my experience in robotics and embedded systems, I believe that deep learning occurs when students connect abstract concepts to concrete implementations and learn from both successes and failures. My approach creates an inclusive environment where students develop both technical expertise and professional skills through practical experimentation.

Teaching Methods and Experience

Classroom Approach My teaching methodology combines rigorous foundations with hands-on experiences. In Embedded Systems, I developed a PyBullet simulation environment that allowed students to experiment with control theory before implementing on real hardware. This approach helped students build intuition about complex topics while providing a safe space for experimentation. I create inclusive learning environments through flexible office hours, detailed documentation, and collaborative projects that accommodate diverse skill levels.

Past Teaching Experience As a Teaching Fellow at Boston University, I have taught core computer science courses and led significant student projects:

- **F1Tenth Racing Team (2024)**: Led 11 students in developing an autonomous racing platform, effectively running a project-based course. Students implemented advanced control algorithms, computer vision systems, and real-time software while learning collaborative development practices. The team's success (second place) demonstrated the effectiveness of this hands-on approach.

- **Embedded Systems (CS 454/654)**: Led weekly lab sections for 24 students, creating four progressive projects spanning system identification, vision processing, reinforcement learning, and real-time communication. Students gained practical experience with both theoretical concepts and hardware implementation.

- **Distributed Systems (CS 350)**: Designed a Raft-based distributed locking assignment with comprehensive testing infrastructure, helping students understand consensus algorithms through practical implementation.

- **Data Science (CS 506)**: Delivered lectures on core topics and supervised industry-partnered projects in fraud detection and aviation safety analysis.

Educational Goals

Student Development I develop students who can think critically about system design, apply theoretical knowledge to real-world problems, and work effectively in teams. Through carefully designed projects, code reviews, and industry best practices, students learn both technical implementation and professional

development skills. Regular presentations and peer feedback help build communication abilities essential for their careers.

Course Development I am prepared to teach core CS courses (Operating Systems, Distributed Systems) and specialized topics in Robotics, Control Theory, and Machine Learning. I propose developing new courses that align with emerging needs:

1. "Reliable Robotic Systems": Combining control theory and machine learning
2. "Resource-Constrained Computing": Efficient algorithm design and implementation
3. "Applied Reinforcement Learning": Bridging theory and practice

Mentorship and Broader Impact

My mentorship experience spans various contexts and skill levels. I have:

- Led the F1Tenth Racing Team of 11 students to second place, developing their skills in autonomous systems
- Mentored graduate students whose work led to publications at top venues (ECCV 2024)
- Guided students through research programs (RISE, Kilachand Honors College) and industry projects
- Supported students who have gone on to prestigious institutions like UC Berkeley

I am committed to fostering diversity in computer science through:

- Active recruitment of underrepresented students for research opportunities
- Creation of accessible learning materials and resources
- Development of inclusive project frameworks that accommodate different learning styles
- Participation in outreach programs like AI4ALL to inspire the next generation of researchers

Integration with Department

I am excited to contribute to the department's teaching mission by:

- Teaching core CS courses while bringing in real-world applications
- Developing new courses that bridge theory and practice in robotics and embedded systems
- Contributing to curriculum development in areas of growing importance like AI safety and efficient computing
- Connecting engineering labs with machine learning research groups as well as programming languages groups

Through these initiatives, I aim to help prepare students for both academic and industry careers while maintaining the department's high standards of excellence in education.