SYLLABUS

ENGR 2230

Mentorship in Robotics, 1 Credit Hour
Autumn 2023, Session 2

COURSE OVERVIEW

General information

Lecture: Mondays, 6:30 PM – 8:15 PM
Instructors: Dr. Saeedeh Ziaeefard (ziaeefard.1)
Teaching assistants: Noah Charlton (charlton.78), Brach Knutson (knutson.39), and Hadley Arch (arch.11)
Office hours: By appointment

Course description

This course will support students to engage with FIRST Robotics Competition teams by supporting their development as mentors for K-12 robotics teams. In one 1-hour 45-minute weekly meeting session, students will learn both mentorship and robotics fundamentals from both the course instructors as well as OSU students engaged with these programs. Class time will be a mix of lecture and interactive learning modules. Prereq or taken concur: enrolled in a survey course.

Course learning outcomes

1. an ability to develop and demonstrate effective mentorship skills
2. an ability to gain hands-on experience with applying principles of engineering, science, and mathematics to basic robotics components
3. an ability to communicate effectively with a range of audiences
4. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

Course goals

1. Mentorship
   a. Students will be able to list and describe different learning styles and explain the significance of adapting to different learning styles in mentorship
   b. Students will develop and demonstrate effective mentorship skills including facilitating team dynamics and creating a supportive and inspiring learning environment
   c. Students will be able to discuss the benefits of robotics-based STEM education and university student mentorship for K-12 students

2. Robotics
   a. Students will be able to identify and explain basic robotics components including wheels and drivetrain, motors and gears, sensors and wiring, robot programming, among others
   b. Students will practice basic tool use and robotics assembly procedures

3. Interpersonal skills
   a. Students will be able to identify and describe strategies for interpersonal connection
   b. Students will be able to define and explain the significance of empathy in engineering for effective mentorship, teamwork, and design

HOW THIS COURSE WORKS

Mode of delivery: This course is delivered in-person, with one lecture session per week.

Pace of course activities: Course material for students will be posted at least one week ahead of time on the course Carmen page. Students are expected to keep pace with weekly deadlines but may schedule their efforts freely within that time frame.

Health and safety requirements: All students, faculty, and staff are required to comply with and stay up to date on all university safety and health guidance
Non-compliance will be warned first and disciplinary actions will be taken for repeated offenses.

**Attendance and participation requirements:** Consistent engagement is expected. If any problems arise relative to attendance, please contact the instructors as soon as possible. Communication is important. You are encouraged to participate in class, ask questions, and share your experiences relative to the subjects and discussion that day.

The following is a summary of everyone's expected participation:

- **Classroom attendance**
  Complete all required assignments before coming to class. Get the most out of every lecture by following the study cycle.

- **Classroom participation**
  Display active engagement with students and instructors in discussions and group work.

In class, we have frequent opportunities to discuss course topics. Students will be coming into the class with a wide range of experiences and thoughts about mentorship and robotics. While we do our best to create a welcoming classroom, there may be occasions when class materials discussions and so forth are triggers for you. Please let us know if this is the case so that together we can find a solution and you can help us to improve the quality of the course and our awareness of the issues. **Let us maintain a supportive learning community where everyone feels safe and where people can disagree amicably.**

**COURSE MATERIALS AND TECHNOLOGIES**

**Course technology**

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at [https://ocio.osu.edu/help/hours](https://ocio.osu.edu/help/hours), and support for urgent issues is available 24/7.

- **Self-service and chat support:** [http://ocio.osu.edu/selfservice](http://ocio.osu.edu/selfservice)
- **Phone:** 614-688-HELP (4357)
- **Email:** 8help@osu.edu
- **TDD:** 614-688-8743
Required software

**Microsoft Office 365:** All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft’s Student Advantage program. Full instructions for downloading and installation can be found [http://office365.osu.edu/](http://office365.osu.edu/). The course location is TBD.

Homework, grading, and faculty response

How your grade is calculated

<table>
<thead>
<tr>
<th>ASSIGNMENT CATEGORY</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance and participation</td>
<td>20</td>
</tr>
<tr>
<td>In-class assignments</td>
<td>35</td>
</tr>
<tr>
<td>Homework</td>
<td>20</td>
</tr>
<tr>
<td>Group Projects (Final Presentation)</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*See course schedule, below, for due dates.*

*There will be no final exam for this course.*

Assignments (category)

**Attendance and participation:**
Students will attend class and be actively engaged with other students and instructors in discussions and group work. Students are expected to keep up to date with Carmen to see course schedule.

**In-class assignments:**
Students will work in groups to complete five Class Participation Activities (CPA) to learn about FRC robots:

- Groups will work to find different parts of a robot by searching a CAD file.
• Groups will design a robot for a specific challenge and then receive feedback from another group.
• Groups will work with basic hand tools to assemble the Kit of Parts Chassis.
• Groups will create a simple program to allow for autonomous and teleoperated control of a robot drivetrain.
• Groups will wire a simple electronics board with all the components required to pass inspection at competition.

Students will also complete three assignments related to mentoring:
• Students will learn about a specific FRC robot from a previous competition and explain its features to other students.
• Students will present to a small group about one of the weekly readings/lectures.
• Students will participate in a review activity where they teach other students about a topic they deeply understood previously covered in the course.

Homework:
Students will complete four preparation assignments related to in class activities, analyze four articles/lectures about robotics, write a CPA reflection assignment, and post on a first week discussion board. The four articles/lectures will cover different fields of mechanical engineering, robotics software development, and FRC specific technologies.

Group research final presentation:
Students will work in groups to conduct research on how a concept or technique is used in FRC. Groups will be assigned based on the student’s interest and which sub team they would help on a FRC robotics team (mechanical, electrical, software, business, etc.).

The group will create a presentation to share their research to the class. The presentation should cover advanced technical information about their topic and relate that topic to mentoring a high school robotics team. The presentation should be in a style that corresponds to a mentor-student dynamic.

Late assignments
All assignments should be turned in before the beginning of class on the due dates specified on Carmen. Submission methods will be communicated by the instructors. Acceptance of late submissions must be communicated with the instructors. Please check with us as soon as possible if you think that you will miss an assignment deadline.
Grading scale

93–100: A
90–92.9: A-
87–89.9: B+
83–86.9: B
80–82.9: B-
77–79.9: C+
73–76.9: C
70 – 72.9: C-
67 – 69.9: D+
60 – 66.9: D
Below 60: E

Instructor feedback and response time

We are providing the following list to give you an idea of our intended availability throughout the course. (Remember that you can call 614-688-HELP at any time if you have a technical problem.)

- **Grading and feedback**: For large weekly assignments, you can generally expect feedback within **7 days**.
- **E-mail**: We will reply to e-mails within **24 hours on school days**.

**OTHER COURSE POLICIES**

**Academic integrity policy**

**POLICIES FOR THIS ONLINE COURSE**

- **Disruptive behavior or clothes**: Disruptive behavior or clothes will not be tolerated. Examples of disruptive behavior include disrespectful comments, noisy mobile phones, playing games, and excessive tardiness. Please turn off or mute cell phones, laptops, and other devices. If ringtones or music is audible, it is too loud! Hats are acceptable if they do not cover your face. I want to communicate with you, not your mobile device. All students must wear shirts and pants/shorts during class.
- **Written assignments**: Your written assignments, including discussion posts, should be your own original work. In formal assignments, you should follow **MLA** style to cite the
ideas and words of your research sources. You are encouraged to ask a trusted person to proofread your assignments before you turn them in—but no one else should revise or rewrite your work.

- **Reusing past work**: In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you’ve explored in previous courses, please discuss the situation with course instructors.

- **Collaboration and informal peer-review**: The course includes many opportunities for formal collaboration with your classmates. While study groups and peer-review of major written projects is encouraged, remember that comparing answers on an assignment is not permitted. If you’re unsure about a particular situation, please feel free just to ask ahead of time.

**OHIO STATE’S ACADEMIC INTEGRITY POLICY**

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University’s *Code of Student Conduct*, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University’s *Code of Student Conduct* and this syllabus may constitute “Academic Misconduct.”

The Ohio State University’s *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: “Any activity that tends to compromise the academic integrity of the University, or subvert the educational process.” Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University’s *Code of Student Conduct* is never considered an “excuse” for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University’s *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact us.
Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages (COAM Home)
- Ten Suggestions for Preserving Academic Integrity (Ten Suggestions)
- Eight Cardinal Rules of Academic Integrity (www.northwestern.edu/uacc/8cards.htm)

Copyright disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Statement on title IX

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.edu or by contacting the Ohio State Title IX Coordinator at titleix@osu.edu

Your mental health

A recent American College Health Survey found stress, sleep problems, anxiety, depression, interpersonal concerns, death of a significant other and alcohol use among the top ten health impediments to academic performance. Students experiencing personal problems or situational crises during the semester are encouraged to contact the College of Pharmacy Office of Student Services in room 150 Parks Hall (614-292-5001) OR OSU Counseling and Consultation Services (614-292-5766, https://ccs.osu.edu/) for assistance, support and advocacy. This service is free and confidential.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations
The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let us know immediately so that we can privately discuss options. To establish reasonable accommodations, we may request that you register with Student Life Disability Services. After registration, make arrangements with us as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion.

**SLDS contact information:** slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.
# COURSE SCHEDULE (TENTATIVE)

For specific deadlines and due dates, please see the course Carmen page.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week 1</strong>&lt;br&gt;10/16</td>
<td>• Syllabus review  &lt;br&gt;• Introduction to K-12 educational robotics programs  &lt;br&gt;• Overview of Engineering and Robotics  &lt;br&gt;• Robot CAD Scavenger Hunt CPA</td>
<td>• Pre-assignment for Robot Speed Dating (due Week 2)  &lt;br&gt;• Discussion Board – Week 1, YPP and Conflict Resolution (due Week 2)</td>
</tr>
<tr>
<td><strong>Week 2</strong>&lt;br&gt;10/23</td>
<td>• Role of Mentorship in FIRST Programs  &lt;br&gt;• Educational Technical Communication  &lt;br&gt;• Robot Speed Dating Activity  &lt;br&gt;• Robot Design CPA</td>
<td>• Pre-assignment for respective CPA rotation (due Week 3)  &lt;br&gt;• Weekly Reading 1 (due Week 3)</td>
</tr>
<tr>
<td><strong>Week 3</strong>&lt;br&gt;10/30</td>
<td><strong>CPA rotations:</strong>  &lt;br&gt;• Robot drivetrain build  &lt;br&gt;• Electronics basics  &lt;br&gt;• Teleoperated robot control</td>
<td>• Pre-assignment for respective CPA rotation (due Week 4)  &lt;br&gt;• Weekly Reading 2 (due Week 4)</td>
</tr>
<tr>
<td><strong>Week 4</strong>&lt;br&gt;11/6</td>
<td><strong>CPA rotations:</strong>  &lt;br&gt;• Robot drivetrain build  &lt;br&gt;• Electronics basics  &lt;br&gt;• Teleoperated robot control</td>
<td>• Pre-assignment for respective CPA rotation (due Week 5)  &lt;br&gt;• Weekly Reading 3 (due Week 5)</td>
</tr>
<tr>
<td><strong>Week 5</strong>&lt;br&gt;11/13</td>
<td><strong>CPA rotations:</strong>  &lt;br&gt;• Robot drivetrain build  &lt;br&gt;• Electronics basics  &lt;br&gt;• Teleoperated robot control</td>
<td>• CPA Reflection (due 1 week after last CPA completed)  &lt;br&gt;• Weekly Reading 4 (due Week 6)</td>
</tr>
<tr>
<td><strong>Week 6</strong>&lt;br&gt;11/20</td>
<td>• Weekly Reading Mentoring Activity  &lt;br&gt;• Introduction to final project  &lt;br&gt;• Makeup/Finish Missed CPAs</td>
<td>• All CPAs Due by END of class 11/20</td>
</tr>
<tr>
<td><strong>Week 7</strong>&lt;br&gt;11/27</td>
<td>• Robotics Review Activity  &lt;br&gt;• Workday for final project</td>
<td>• Final Project (due Week 8)</td>
</tr>
<tr>
<td><strong>Week 8</strong>&lt;br&gt;12/4</td>
<td>• Presentations for final project</td>
<td>• End of Course Survey (due 12/10)</td>
</tr>
</tbody>
</table>

CPA = Class Participation Activity