CPSC 363: Robotics
Fall 2025

Meeting Space: Trexler 272	Time: MWF 12.00 – 1.00 pm
Instructor: Dr. Avijit Sarker	Office: Trexler 266B
Email: sarker@roanoke.edu	Office hours: MWF 2.00-3.00, or by appointment
Course Site: Roanoke College	Phone: 662-380-1775 (cell); 540-375-2320(office)

Prerequisites: CPSC 120 and CPSC 170

Course Materials:
Required Book:

- "Modern Robotics: Mechanics, Planning, and Control," Kevin M. Lynch and Frank C. Park, Cambridge University Press, 2017, ISBN 9781107156302.

https://hades.mech.northwestern.edu/index.php/Modern_Robotics#Online_Courses

- Introduction to Autonomous Robots (Correll)

https://eng.libretexts.org/Bookshelves/Mechanical_Engineering/Introduction_to_Autonomous_Robots_(Correll)

- Class Lecture
- Video Lecture

Course Overview: This course focuses on the design and development of embedded systems for robotics. Students will use the Arduino microcontroller to create a mobile, sensing robot. Topics include electronics, circuits, embedded systems, 3D printing, physical computing, and real-time computing.

Learning Outcomes: At the end of the course the successful student will be able to

1. read, design, and implement circuit schematics.
2. write programs for the Arduino microcontroller.
3. model and print 3D parts.
4. create a mobile robot capable of sensing and responding to its environment.

Time Commitment: Students are expected to put in approximately 12 hours per week of work in order to successfully complete this course, including class time. The exact amount of time each student needs to devote to this class to be successful will vary, but 12 hours is a reasonable amount of time to budget for this class.

Attendance: Attendance and participation are essential for achieving the planned learning outcomes of this class. You are required to attend every class and attendance will be taken daily. If you show up 10 minutes late, you will be marked absent. I understand that some absences are unavoidable. Any planned absences should be communicated with me in advance (~2 days in advance). Unexpected absences should be communicated with me as soon as possible. It is your responsibility to make up for the work that you missed.

Grading: Grades for this course will be based on homework assignments, tests, quizzes, participation, and a project. Grades will be assigned using the following scale: A 100-93, A- 92.9-90.0, B+ 89.9-87.0, B 86.9-83, B- 82.9-80.0, C+ 79.9-77.0, C 76.9-73, C- 72.9-70.0, D+ 69.9-67.0, D 66.9-63, D- 62.9-60.0, F 59.9-0. The approximate grading distribution is in the table below.

Assignments or Homework	15%
Midterm	10%
In-Class participation	10%
Final	12%
Projects	50%
Co-curricular	3%

Assignment or Homework: There will be one set of problems assigned approximately every two weeks. The homework sets will be posted on Inquire. Assigned homework must be submitted by the indicated due date. See the late work policy below for more details.

Homework Assistance: Homework is assigned to provide you with additional structured practice solving the types of problems that you will encounter on exams. If you get stuck on a problem, you should get help learning to solve the problem prior to the due date so that you will be better prepared for the next exam. Copying an answer from another student, a generative artificial intelligence platform (e.g., ChatGPT), or another source may help you get the right answer on the homework but will not help you to learn the material.

In-Class Participation: You will also be required to complete problems assigned in class. Participation in class discussions is also an important aspect of learning the material.

Exam: One midterm and one comprehensive final exam will be given. Final exam will take place Friday December 12th from 2:00 to 5.00 pm.

Projects: In addition to the smaller assignments there will three large projects. The projects will require designs that use hardware not purchased at the beginning of the semester. You are encouraged to start on them immediately when assigned to allow for delivery of hardware components.

Co-curricular: The Department of Mathematics, Computer Science, and Physics is offering a series of lectures designed to engage the campus community in discussions of ongoing research, novel applications, and other issues that face these disciplines. You are invited to attend all of the events but participating in at least three is mandatory. Within one week of attending an event you must submit a one page, single-spaced, paper (to Inquire) reflecting on the discussion. If you do not turn the paper in within the one week time frame you may not count that event as one you attended.

Late Work: All work should be submitted by the assigned deadline. If you have extenuating circumstances that prevent you from submitting work on-time, please communicate with me in advance. Late work may be accepted, but for reduced credit. After two weeks past the originally-assigned due date, no credit will be awarded for the assignment.

Office Hours: Feel free to text me to set up a meeting, or simply stop by my office. If I'm unavailable, we can arrange a Zoom meeting instead.

Electronic Devices in Lecture: Cell phones should be put away during class time, except at the direction of the instructor.

Class Disruption: All students are entitled to a professional learning environment. Students should not act in a manner which will distract and disrupt the class learning experience. Cell phones or any other electronic communication/entertainment devices, except for tablets/laptops used for taking notes, must be either turned off or silenced at all times during the lecture period.

Academic Integrity: Maintaining academic integrity is a mutual responsibility for all of us. I will be respectful of your time and make sure I am available during my office hours and will communicate with you in a timely manner. I expect the same in terms of your timeliness, honesty and sustained effort. Plagiarism and cheating are unacceptable and also violate RC policies. Refer to the "Academic Integrity" page on the RC website– https://www.roanoke.edu/inside/a-z_index/academic_integrity
included here is an explanation of how violations of the College's academic integrity policy are handled.

Accessible Education Services (AES) is located on the first floor of the Bank Building. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Dustin Persinger, Assistant Director of Academic Services for Accessible Education, at 540-375-2248 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Dustin Persinger at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester. The testing center, also located on the first floor of the Bank Building, can be reached at 540-375-2247.

Student Health & Counseling Services supports students through in-person health appointments, in-person counseling, 24/7 telehealth (TimelyCare), Therapy Assistance Online, as well as resources related to general wellness, LGBTQ+, sexual assault, substance abuse, and suicide prevention. Unmet health needs can negatively impact your performance in this course. Student Health & Counseling Services can help. Please see https://www.roanoke.edu/shcs for more information and to access services.

Diversity: I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

Name/Pronouns: I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.