

MECA 470: Introduction To Robotics Engineering

Spring 2023

Instructor: Stewart Lamon
E-mail: Slamon1@csuchico.edu
Office: OCNL 418
Office Hours: Monday 11-1
Tuesday 10-11
Wednesday 10-11
Sections: Lecture (Plumas 112):
Monday Wednesday 8:00-8:50AM
Lab (Plumas 112)
Friday 2:00-3:50PM

Course Description and Goals

Introduction to the manipulation, programming, dynamics, and control of robotics. This class will cover forward and inverse kinematics. Degrees of freedom of rigid body systems. Trajectory generation and motion planning techniques. Analysis of configuration, task, and work spaces of robotic systems.

Prerequisites

CSCI 111 or MECH 208, MECH 320 (co-requisite)

Student Learning Objectives

After completion of this course, students will be able to:

- Understand Degrees of Freedom of Rigid Body Systems
- Work Within Configuration, Task, and Work Spaces of Robotic Systems
- Apply Coordinate Frame Transforms
- Program ROS for Simulation and Control
- Program Omron ACE for Simulation and Control
- Understanding and Avoidance of Singularities
- Analyze Dynamics and Manipulation with the Jacobian
- Analyze Static and Velocity Kinematics
- Apply Concepts of Trajectory Generation
- Understand Motion Planning Concepts
- Implement PID Control Systems for Motion Tracking

Course Usage of Blackboard Learn

Copies of the course syllabus, all assignments, schedule, and due dates can be found on Blackboard Learn. You are responsible for regularly checking Blackboard for updates and announcements, which can be accessed through the [Chico State Portal](#).

Classroom Etiquette

During classroom sessions, students are expected to be completely engaged and committed to the class (no personal web surfing, messaging, social media, etc.).

Dropping and Adding

You are responsible for understanding the policies and procedures about add/drops, academic renewal, etc., found in the [CSU Chico University Catalog](#). You should be aware of the new deadlines and penalties for adding and dropping classes.

Grading Policy

- 40% Lecture Assignments
- 40% Lab Assignments
- 20% Quizzes

A ≥ 93% > A- ≥ 90% > B+ ≥ 87% > B ≥ 83% > B- ≥ 80% > C+ ≥ 77% > C ≥ 73%
73% > C- ≥ 70% > D ≥ 60% > F

Late Assignments

Late assignments will be accepted up to a week late for reduced credit

Equipment / Textbooks / Additional Resources**Computer and Software (Required)**

You are required to have a laptop capable of running ROS Windows and Omron ACE

Course Textbook (Required)

Kevin Lynch, Modern Robotics
ISBN: 978-1107156302

Digital version is acceptable. Preprint edition and other materials related to the book can be found for free at: [http://hades.mech.northwestern.edu/index.php/Modern Robotics](http://hades.mech.northwestern.edu/index.php/Modern_Robotics)

Recommended (Optional)

Peter Corke, Robotics Vision and Control
ISBN: 978-3319544120

Another great robotics textbook. Goes into greater depth on computer science and machine vision/learning for robotics

University Policies and Campus Resources

University Policy Regarding COVID-19 Safety

On-Campus Spaces for Attending Online Classes (Optional)

For students who have a mix of online and in-person classes, the University has prepared spaces for students to attend classes on-campus. The closest options to our classrooms include Meriam Library (MLIB), Bell Memorial Union (BMU), and the Science Building (SCI), more information can be found here: [Student Learn Space Locations](#).

Academic Integrity

Students are expected to be familiar with the University's Academic Integrity Policy. Your own commitment to learning, as evidenced by your enrollment at California State University, Chico, and the University's Academic Integrity Policy requires you to be honest in all your academic coursework. Faculty members are required to report all infractions to the Office of Student Judicial Affairs. The policy on academic integrity and other resources related to student conduct can be found on the [Student Judicial Affairs website](#).

IT Support Services (Optional)

Computer labs for student use are located on the first and fourth floor of the Meriam Library, Room 116 and 450, Tehama Hall Room 131, and the Bell Memorial Union (BMU) basement. You can get help using your computer from IT Support Services; contact them through the [ITSS web site](#). Additional labs may be available to students in your department or college.

Student Services (Optional)

Student services are designed to assist students in the development of their full academic potential and to motivate them to become self-directed learners. Students can find support for services such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. Student services information can be found on the [current students page of the CSU Chico web site](#).

Americans with Disabilities Act

If you need course adaptations or accommodations because of a disability or chronic illness, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Please also contact Accessibility Resource Center (ARC) as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. ARC will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations.

[Accessibility Resource Center](#)

530-898-5959

Student Services Center 170 arcdept@csuchico.edu

Student Learning Center (Optional)

The mission of the Student Learning Center (SLC) is to provide services that will assist CSU, Chico students to become independent learners. The SLC prepares and supports students in their college course work by offering a variety of programs and resources to meet student needs. The SLC facilitates the academic transition and retention of students from high schools and community colleges by providing study strategy information, content subject tutoring, and supplemental instruction. The University Writing Center has been combined with the Student Learning Center. You can also visit the [Student Learning Center web site](#).

Blackboard ALLY

Chico State is committed to providing you the best learning experience possible. With this goal we have activated Blackboard ALLY in your courses. ALLY is a revolutionary product that focuses on making digital course content more accessible to all students. You will now be able to download any content in this course in the format that fits best with your learning style. PDF, HTML, .EPUB and Audio files are now available for most content items. Here is a link to more information on formats available as well as what each format offers. Should you have any questions or experience issues while using ALLY please contact the Office of Accessible Technology and Services at oats@csuchico.edu or 530-898-6532.