Lewis University
College of Arts and Sciences
Undergraduate/Graduate Programs

Course Number: CPSC 65000
Course Title: Programming Languages

3 credit hours

Instructor: Eric Y. Chou, Ph.D.
Office Hours: *By Appointment (Online anytime)*
Office Location: *Online (Collaborate/Facebook/Zoom.us)*
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Expected response time: Within 24 hours

Semester: Fall 2020
Session:
Campus: On-line
Meeting Day: W, F
Meeting: 12P-1:30P
Start date:
End date:

Course Description (Rationale)

The purpose of this course is to introduce you to basics of modeling, design, planning, and control of robot systems. In essence, the material treated in this course is a brief survey of relevant results from geometry, kinematics, statics, dynamics, and control.

The course is presented in a standard format of lectures, readings and problem sets. There will be quizzes, homework and a final project. These quizzes will be open book. Lectures will be based mainly, but not exclusively, on material in the Blackboard course shell and textbook. Lectures will follow roughly the same sequence as the material presented in the book, so it can be read in anticipation of the lectures

Student Learning Outcomes (Goals)

We will work hard to present the subject clearly, provide the student with examples. Programming, when feasible, is the method of choice. The student will be assigned homework, lab works, quizzes and projects. We expect the student to participate to discussions, ask questions and help the teacher and the class in achieving our objectives. A term project and its presentation are included. This term project experience will lead to mastering independent project development skills and getting ready for job interviews.

After completion of this course, a student will be able to

- Use relevant kinematics equations to describe an autonomous agent's motion.
- Model the electromechanical systems that comprise a robot mathematically.
- Design and implement electromechanical circuits that perform certain behaviors.
- Identify robot architectures and the jobs to which they are best suited.
- Specify the requirements for a robotics project in terms of physical parameters.
- Optimize energy efficiency associated with a given task.
- Build and test a robot from an original design.

Relationship to Mission

Lewis University is a Catholic University in the Lasallian Tradition. Our Mission is integrated into all aspects of University life, including this course. This course embraces the Mission of the University by fostering an environment in which each student is respected as an individual within a community of learners. In the spirit of the vision of Lewis University, the goals and objectives of this course seek to prepare students to be successful, life-long learners who are intellectually engaged, ethically grounded, socially responsible, and globally aware.
Lewis University Mission Statement Sanctified Zone University Ministry

Required Instructional Materials

Textbook:
Robotics: Modelling, Planning and Control, by Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, andGiuseppe Oriolo, Publisher: Springer, 1st ed. 2009 Edition. (paper) ISBN-13: 978-1846286414, ISBN-10: 1846286417

Other Reference Materials: None
Check Blackboard platform for extra reading materials and links.

Hardware & Software Requirements:
A general purpose PCs or other mobile devices meeting Blackboard Hardware Requirements.
Some features, on Blackboard platform, are not fully supported for mobile devices.
Please submit all your assignments using PCs.

Policies and Procedures

Academic Success

We expect all students to use a computer on a regular basis to access course materials. Students are responsible for all information, including linked information, in the course syllabus and the Blackboard course site. *Note*: Not all learning materials will be available via smartphones or tablets. For more information, read: Being a Successful Online Student.

Lewis Email: The Lewis email will be used to communicate with students. Students are required to regularly check their email for information regarding updates to class requirements, campus closings, feedback from instructors, etc.

Blackboard Confidentiality: The materials listed in this course shell are only for the use of students enrolled in this course for the purposes associated with this class and may not be retained for further dissemination.

Discussion Confidentiality: Sometimes during online discussions, students will offer information from their place of employment. This may include policies, practices, strategies, and future initiatives. With respect for the other members in the class, we will treat all discussions as CONFIDENTIAL CLASS DISCUSSIONS – that is, information that will not leave the online discussion board.

Academic Honesty: Scholastic integrity lies at the heart of Lewis University. Plagiarism, collusion and other forms of cheating or scholastic dishonesty are incompatible with the principles of the University. Students engaging in such activities are subject to loss of credit and expulsion from the University.

Attendance: Students are expected to attend all online sessions/classes as part of the normal learning process. In addition, students must be especially consistent in attendance, both on-ground and online, during the first two weeks of the semester to confirm registration and to be listed on the official course roster. Students who fail to follow this procedure and who have not received prior approval from the instructor for absences will be withdrawn from the courses in question by certification of the instructor on the official class lists. Instructors may publish specific, additional standards of attendance for their classes in the course syllabus. Students may receive failing grades if they do not observe attendance requirements set for their classes. The Illinois Student Assistance Commission also requires attendance as a "demonstration of academic progress toward a degree" as one criterion for retaining financial aid awards.

Late Assignment Policy: It is expected that all assignments will be submitted on time unless prior arrangements (before the due date) are made. An extension is not automatically granted.

Make-Up Attendance or Assignment Policy: Students may not miss more than one class session during an eight-week period. If you miss a class, you must contact your classmates to obtain notes and write a detailed report on what was missed, and submit the report at the next class. Missed assignments will not be accepted if submitted more than one week late (see Late Assignment Policy above).

Drop and Withdrawal Deadlines: An eight-week course may be dropped with a full refund in the first week and a partial refund in the second week. You may withdraw from an eight-week course through the end of the fifth week. For specific details and more information, see: Office of the Bursar

Academic Integrity: Scholastic integrity lies at the heart of Lewis University. Plagiarism, collusion and other forms of cheating or scholastic dishonesty are incompatible with the principles of the University. Students engaging in such activities are subject to loss of credit and expulsion from the University. Cases involving academic dishonesty are initially considered and determined at the instructor level. If the student is not satisfied with the instructor's explanation, the student may appeal at the department/program level. Appeal of the department /program decision must be made to the Dean of the college/school. The Dean reviews the appeal and makes the final decision in all cases except those in which suspension or expulsion is recommended, and in these cases the Provost makes the final decision.

University Student Complaint Policy
The University Student Complaint Policy can be found at lewisu.edu/studentcomplaints

University Grade Appeal Policy
The University Grade Appeal Policy can be found at lewisuedu/studentcomplaints

Assistance

Americans Disabilities Act (ADA): If you have a disability that may require consideration by your instructor and you have not previously submitted documentation to the staff in the Leckrone Academic Resource Center (LARC), please make an appointment with Denise Rich, Director of Academic Support Services in LARC (x5593). For specific details and more information, see ADA Accommodations.

Special Accommodations: Lewis University is committed to providing equal access and opportunity for participation in all programs, services and activities. If you are a student with a disability who would like to request a reasonable accommodation, please speak with the Learning Access Coordinator, Angelia

Martinez, at the Center for Academic Success and Enrichment (CASE). Please make an appointment by calling 815-836-5593 or emailing learningaccess@lewisu.edu. For more information about academic support services, visit the website at: www.lewisu.edu/CASE. Since accommodations require early planning and are not provided retroactively, it is recommended that you make your request prior to or during the first week of class. It is not necessary to disclose the nature of your disability to your instructor.

Other Assistance:

Blackboard	Lewis University Library	Lewis Writing Center
IMPACT Lab	Bookstore	Recreation and Fitness Center
Career Services	Health and Counseling Services	Help Desk

Grading

Accumulated Points System:
We use an Accumulated Points System for grading.

For example, quiz 1 is worth of 100 pts with 10 bonus pts. Quiz 2-1 is worth of 50 pts with 5 bonus pts. Term project is worth of 500 pts with 100 bonus pts, and something like that for all assignments.

At the end of the semester, we sum up all your total points, including bonus points. We divide your total pts with the maximum base pts and get a percentage score. Use the percentage score to decide your course grade. Your total pts may be higher than the maximum base pts due to the bonus pts.

Grades are calculated based on the percentage score, as follows:

Score	*Grade*
90% and above	A
80% up to 89%	B
70% up to 79%	C
60% up to 69%	D
59% and below	F

Note:
Percentage score will be rounded off to the 100th digit. For example, if your percentage score is 79.95, you will receive the B grade for the course. If your percentage score is 79.949…, you will receive a C grade.
The instructor reserves the right to modify the syllabus and/or assignment schedule; however, students will be notified via Lewis email prior to any change.

Schedule:

Week 1: Chapter 1: introduction to robotics, Appendix A: Review of Linear Algebra
Week 2: Chapter 2: Kinematics, Rotational Matrix, Displacement Vector
Week 3: Chapter 2/3: Inverse Kinematics and Differential Kinematics
Week 4: Chapter 3/4: Kinematics/Trajectory Planning
Week 5: Chapter 5: Actuators and Sensors
Week 6: Chapter 10: Vision
Week 7: Chapter 6, 7, 9: Control
Week 8: Chapter 8, 11, 12: motion control, mobile robots and motion control.