

MTU

Real-Time Robotics Systems.

Course Number: EET 4144
Course Name: Real-Time Robotics Systems
Credits: 4 semester credits (0-3-1)
Semester: Spring 2010
Section: R01 – L01, L02

Instructors: Alex Sergeev
Office: 413 EERC Building
Telephone: 906-487-2258
Email: avsergue@mtu.edu
Office Hours: T 2-4; F 4-5
Web: <https://www.tech.mtu.edu/~avsergue>

Day / Time: Recitation: MWF 3:05 to 3:55
Lab: L01 T 11:05 to 1:55
L02 Th 9:05 to 11:55

Rooms: Recitation: Room EERC 427
Lab: Room EERC421

Textbook: James A. Rehg., Introduction to Robotics in CIM Systems, 5th Edition, Prentice-Hill, 2003.

Course Description: Theoretical background on a robot system, safety, types of robots, mechanics and control, electronic system components, hardware and software. Learn and apply ROBOGUIDE simulation software. Hands-on experience programming and manipulating the industrial FANUC robot in step-by-step and production modes.

Course Objectives:

Upon successful completion of this course students should have the knowledge to:

- Discuss the CERT Cart Safety.
- Explain different frames that uses robotic arm.
- Describe different inputs and outputs and how to configure them
- Understand and apply various program instructions and macro commands.
- Be able to modify the program in different levels.
- Explain how to setup a robot for production using teaching pendant.
- Describe how to manipulate files: copy and delete programs, backup all or specific types of files to a specific device. Learn how to load program from the backup device and how to do an image backup and restore
- Demonstrate proficiency simulating operation of the robot via ROBOGUIDE simulation software.
- Demonstrate proficiency manipulating robotic arm and successfully complete the assigned tasks.

Class Sessions: Class time will be devoted to presenting new topics and working through example problems.

Course Evaluation:

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| Homework (will be assigned but not graded) | 0% |
| Quizzes | 20% |
| Lab Assignments | 30% |
| Presentation\Report | 15% |
| Midterm Exam | 15% |
| Final Exam | 20% |

Grading Scale:

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|----------------|----|
| 90% or greater | A |
| 85 – 89 | AB |
| 80 – 84 | B |
| 75-79 | BC |
| 70 – 74 | C |
| 65 – 69 | CD |
| 60 – 64 | D |
| < 60% | F |

Homework: Assigned weekly and solutions sent out via e-mail. Homework assignment will not be graded but should be worked thoroughly to prepare for the following quiz.

Quizzes: Short, announced quizzes will be given upon receiving the homework assignment on the related material. Homework problems or similar will appear on weekly quizzes.

Laboratory Assignments:

Laboratory assignments must be completed as indicated by the instructor. A week is allowed for report to be written when required. No late assignments will be accepted unless prior arrangements with the instructor were made. All work must be completed neatly; assignments that are difficult to read or follow will not be graded.

Before leaving the lab, components should be returned to their proper drawers in the parts cabinet, lead wires should be returned to the racks, and all instruments should be turned off.

The weekly lab experiments are designed to reinforce the topics discussed in recitation. The order in which these experiments are performed will be determined by the recitation topics.

Presentation: Each student will give 20 minute lecture/presentation on the related to the class topics material with the goal to develop and enhance student's presentation skills. Upon presenting the material the student will write a concise report on the presented topic. Possible sources, due dates, and the format of the report will be announced in the class.

Examination: Two-hour final exam will be given at the completion of this class. If you must miss the scheduled exam date, you must make arrangements with the instructor before the exam. If no arrangements are made and your absence is unexcused, your grade will be a zero.

Expectations of Students:

- You will attend class every session, and come to each session prepared, having read the assigned sections of the textbook.
- You will attempt all homework: problems in order to prepare for the quiz.
- You will be respectful to your classmates.
- You will ask for help if needed and contact the instructor to receive assignments you may have missed.
- You are responsible for the material covered in required reading whether that material is covered in lectures or not
- Proper professional and ethical behavior is expected of all students in this class. If cheating is suspected, the Dean of Students will be notified and standard MTU policies will be followed.

Notice: MTU complies with all federal and state laws and regulation regarding discrimination, including the Americans with Disability Act of 1990 (ADA). If you have a disability and need a reasonable accommodation for equal access to education or services at MTU, please call the Associate Dean of Students (487-2212). For other concerns about discrimination, you may contact your advisor or the Affirmative Action Office (487-3310).

Tentative Schedule:

Week Jan 11- Jan 17 **No labs**
Jan 18- Jan 24 Lab 1
Jan 18 **No class** (Martin Luther King Jr. recess)
Jan 25- Jan 30 Lab 2
Feb 1- Feb 7 **No labs** (Winter Carnival)
Feb 5 **No classes** (Winter Carnival)
Feb 8- Feb 14 Lab 3
Feb 15- Feb 21 Lab 4
Feb 22- Feb 28 Lab 5
Mar 1- Mar 7 Lab 6
Mar 3 **Midterm Exam**
Mar 8- Mar 14 **Spring break**
Mar 15-Mar 21 Lab 7
Mar 22- Mar 28 Lab 8
Mar 29- Apr 4 Lab 9
Apr 5 -Apr 11 (**Out of town**)
Apr 12- Apr 18 Lab 10
Apr 19- Apr 25 **No labs**
Apr 26- Apr 30 **Final Exam**