

Cover Page

ETR 286 Principles & Applications of Robotics

Faculty Name: Frederick E. Deen, Jr.

Program Head: Dan Horine

Dean's Review:

Dean's Signature: _____ Date Reviewed: ___/___/___

Revised: Fall 2016

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273



ETR 286

Principles & Applications of Robotics

COURSE OUTLINE

Prerequisite: ELE 134 and ELE 239 or ETR 113. Co-requisite: IND 250. Provides an overview of terminology, principles, practices, and applications of robotics. Studies development, programming; hydraulic, pneumatic, electronic controls; sensors, and system troubleshooting.

Course Description:

Provides an overview of terminology, principles, practices, and applications of robotics. Studies development, programming; hydraulic, pneumatic, electronic controls; sensors, and system troubleshooting.

Part of the course requirements will be to participate in the Autonomous Robot Competition. This entails skills in project management, engineering design, electronic circuit construction, microprocessor programming and working in a team environment.

Semester Credits: 3

Lecture Hours: 9:15 – 9:50 a.m. **Lab/Recitation Hours:** 9:50 – 10:30 a.m.

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273



ETR 286

Principles & Applications of Robotics

Course Outcomes

At the completion of this course, the student should be able to set up, run and maintain an industrial robot.

In addition, at the completion of this course, the student will be able:

- To commission the Modular Production System (MPS®) Station.
- To familiarize yourself with the instruction manuals of the RV-2AJ robot.
- To be able to confirm the reference point.
- To be able to operate the EMERGENCY-STOP devices
- To be able to control the robot arm using the teaching pendant.
- To be able to control the robot in various traversing modes.
- To be able to differentiate between JOINT, XYZ, and TOOL mode.
- To be able to operate the end effector of the robot.
- To be able to position a robot arm using the teaching pendant.
- To be able to define, check, change and delete position numbers.
- To be able to create a program using the teaching pendant.
- To learn procedures to avoid collisions.
- To be able to set the parameters of the serial interface.
- To be able to transfer programs and position lists to/from the controller.
- To be able to use Simulation software to run the program in simulation.
- To be able to use Simulation software to run the program on the robot.
- To be able to define and use variables and position names.
- To be able to design a positional sketch.
- To be able to operate the Teach-In Box of the programming software.

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273



ETR 286

Principles & Applications of Robotics

Required Materials:

Folder or notebook for class notes

Text:

1. **Toolingu online subscription**, available:
 - a. Online at www.toolingu.com (Resources/Pricing) or
 - b. through the Bookstore

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273



ETR 286

Principles & Applications of Robotics

Topical Description:

Tentative Course Topics & Discussion Week:

(Interspersed in our studies will be topics germane to the "Autonomous Robot Competition")

Week	Topic
1	What is robotics?
2, 3	Industrial Robots
4	Robot Drive Units
5	Open and Closed Loop Control of Industrial Robots
6, 7	Programming of industrial robots
8	Safety Systems
9, 10	Assembly and Reference Point Travel of the Robot, BOE-BOT, Mid Term
11	Basic Functions of the Teaching Pendant
12	Programming the Robot Arm Using the Teaching Pendant
13	BOE-BOT optimization, presentations, reports
14	Simulation Software – Communications Settings and Transferring Programs Simulation Software – Programming
15	Simulation Software – Program Structuring Using the Subroutine



ETR 286

Principles & Applications of Robotics

Notes to Instructors

(List information about optional topics, departmental exams, etc.)

1. Participation in the 7th Annual VWCC Autonomous Robotics Competition will be required. Competition rules will be promulgated early in the semester. As appropriate, competitive teams will be formed
- 2.
- 3.
- 4.

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273

