

Course Syllabus

Name of the Course	Introduction to VEX V5 Robotics Programming	Name of the Professor	Venkatesan Muthukumar
Course Code	UNLV-ITEST-002	Cellphone	
Department	Electrical & Computer Eng.	E-mail	vm@unlv.nevada.edu

Course objectives	The main goal of this workshop is to provide teachers with the broad knowledge needed to understand the current technology in Robotics and hands-on skills needed to kick-start programming and development of VEX V5 Robots.
Summary	The workshop instruction starts by introducing the teachers to fundamentals of Robots. This includes the working of different types of motors, speed and position control of different motors, understanding motor specifications and ratings, etc. Next we introduce different forms of robotic controller signal and communication interfaces. Teachers will be able to interface different types of sensors and perform feedback robotic control. Next teachers will be introduced to concepts of forward and reverse robot kinematics and perform control motion and pose control using sensors and visual information.



Topics:

1. Introduction to the Workshop. Fundamentals of Robotics? How did we get here?
2. Introduction to Image Processing, Visual Recognition and Tracking
3. Hardware, Software and the Tools.
4. Understanding and Programming Motors, and Motor Controllers.
5. Sensor Interfaces and Motor Control.
6. Image Processing

Schedule:

Day#	Lecture Topic
5/23	Introduction to the course. Fundamentals of Robotics. How did we get here? Control using joystick or controller.
5/24	Introduction to logic programming of robots using blocky. Simulation using VEX VR. Blocky programming for VEX V5.
5/25	Understanding and Programming Motors, and Motor Controllers. Driving the robot in a straight line, square, or a circle. Control the speed and pose of the robot.
5/26	Sensor Interfaces and Motor Control. Interfacing of sensors to navigate and follow. Collision avoidance and maze.
5/30	Autonomous Navigation Competition
5/31	Introduction to Image Processing, Visual Recognition and Tracking. Collect the blocks.
6/1	Robot Design for Autonomous Object Collection. Final Project Outline

Software Used:

1. VEXCode V5 - Windows 8+, Mac 10.13+, ChromeOS 75+, Web
2. PC/Laptop Requirement - 1GB of HDD Space, 1x USB 2.0 or 3.0 Port, 8 GB+ RAM, i3+ Core.