**UNLV ME 425/625 – Robotics 1 – Fall 2022 (last updated 08/25/22)**

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| Week | Topic |
| Week 1  08/29/22 | |  |  | | --- | --- | | Lecture | Introduction | | Lab | BrixCC setup, NXC programming, Studio | | Homework | NXC data types, if-then, loops, TextOut and FormatNum  Studio: Casters | |
| Week 2  09/05/22 | **Labor Day – UNLV Holiday** |
| Week 3  09/12/22 | |  |  | | --- | --- | | Lecture | Simple Machines I: Levers, Shafts and Cranks | | Lab | LEGO levers, shafts and cranks, Domabot | | Programming | NXC: strings, motors (OnFwd, Rotate), Buttons, and touch sensor | | Homework Additions | NXC: strings, strcount, strnum, etc Domabot touch sensor reaction  Studio: Lift mechanisms; Grabbing things | |
| Week 4  09/19/22 | |  |  | | --- | --- | | Lecture | Simple Machines II: Cams, Springs and Linkages | | Lab | LEGO cams, springs and linkages  Ultrasonic Docking (no feedback) | | Programming | NXC: ultrasonic and infrared | | Homework Additions | NXC: Domabot ultrasonic docking (shortest time)  Studio: Reciprocating motions | |
| Week 5  09/26/22 | |  |  | | --- | --- | | Lecture | Simple Machines III: Ratchets, Drives and Gearing | | Lab | LEGO ratchets, drives and gearing  PID ultrasonic docking (with feedback) | | Programming | NXC Timers | | Homework Additions | NXC: Domabot PID (shortest time)  Studio: Gearing and drives | |
| Week 6  10/03/22 | **Project 1 Relay Race: Introduction**   |  |  | | --- | --- | | Lecture/Lab | PID and Line Following | | Programming | NXC Files | | Homework Additions | NXC: Line Following (say in reverse direction)  Studio: Ratchets | |
| Week 7  10/10/22 | **Project 1 Relay Race: PDR and Practice (No Formal Class)** |
| Week 8  10/17/22 | **Project 1 Relay Race: Competition Day** |
| Week 9  10/24/22 | **Midterm**   |  |  | | --- | --- | |  | Part 1 Closed-book (60-min): Fill-in-the-blanks, essays, etc | |  | Part 2 Open-book (90-min): Hands-on LEGO construction | |
| Week 10  10/31/22 | |  |  | | --- | --- | | Lecture | Motor Theory | | Lab | Motor OL Step Response and Lego Winch | | Programming | Arrays | | Homework Additions | Motor current, torque and speed curves | |
| Week 11  11/07/22 | |  |  | | --- | --- | | Lecture | **Robot Sensing and Actuation**: Numbering systems: voltage dividers, and op-amps | | Lab | LEGO touch sensor; ohmmeter; potentiometer, voltmeter, and voltage supply (bulb/speaker) | | Homework Additions | Light Dependent Resistor | | Prelab | PCF8574 circuit | |
| Week 12  11/14/22 | |  |  | | --- | --- | | Lecture | **Robot Communications**: I2C | | Lab | LEGO PCF8574 LEDs, DIPs, Relays and Transistors, DC Motors | |
| Week 13  11/21/22 | **Project 2 Something – Introduction**  Some ideas:   * Tube Push, Photovore, Braitenbeg Vehicles, Wall-Following |
| Week 14  11/28/22 | **Project 2 Something – PDR and Practice** |
| Week 15  12/05/22 | **Study Week Begins**  **Project 2 Something – Competition Day** |
| Week 16  12/12/22 | **Finals Begin**  **Project Due** |