**UNLV ME 425/625 – Robotics I**

**Spring 2022 (last updated 01/14/22)**

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| Week | Topic |
| Week 1  01/19/22 | |  |  | | --- | --- | | Lecture | Introduction | |  |  | |
| Week 2  01/26/22 | |  |  | | --- | --- | | Lecture | Simple Machines I: Levers, Shafts and Cranks | | Lab | LEGO levers, shafts and cranks | | Programming | LEGO NXC: hello world, motors and touch sensor | |  |  | |
| Week 3  02/02/22 | |  |  | | --- | --- | | Lecture | Simple Machines II: Cams, Springs and Linkages | | Lab | LEGO cams, springs and linkages | | Programming | LEGO NXC: ultrasonic and infrared sensors | |
| Week 4  02/09/22 | |  |  | | --- | --- | | Lecture | Simple Machines III: Ratchets, Drives and Gearing | | Lab | LEGO ratchets, drives and gearing | |  | ML-CAD (or Solidworks) | |  |  | |
| Week 5  02/16/22 | |  |  | | --- | --- | | Lecture/Lab | Putting it all together: Automata Examples (The Gymnast) | |  | Email: Team’s proposed Project | | Programming  Project | LEGO NXC: File handling  **Teams Work on Automata Project** | |  |  | |
| Week 6  02/23/22 | **Team work on their Automata Projects – No Formal Class** |
| Week 7  03/02/22 | |  |  | | --- | --- | | Due: | **Automata Presentation; Report Due** | |
| Week 8  03/09/22 | **Midterm**   |  |  | | --- | --- | |  | Part 1 Closed-book (60-min): Fill-in-the-blanks, essays, etc | |  | Part 2 Open-book (90-min): Hands-on LEGO construction | |
| Week 9  03/16/22 | **Spring Break** |
| Week 10  03/23/22 | |  |  | | --- | --- | | Lecture | Motor Theory | | Programming | LEGO NXC: File handling Timers; Data Acquisition (Motor OL Step Response) | |
| Week 11  03/30/22 | |  |  | | --- | --- | | Lecture | **Robot Sensing**: ADC: binary, voltage dividers | | Lab | LEGO touch sensor; ohmmeter; potentiometer, voltmeter | |  |  | |
| Week 12  04/06/22 | |  |  | | --- | --- | | Lecture | **Robot Actuation**: ADC: operational amplifiers | | Lab | LEGO temperature sensing; DAC power supply; aliasing | |  |  | |
| Week 13  04/13/22 | |  |  | | --- | --- | | Lecture | **Robot Communications**: I2C | | Lab | LEGO PCF8574 LEDs, DIPs | |  |  | |
| Week 14  04/20/22 | |  |  | | --- | --- | | Lecture | **Robot Interfacing**: H-Bridges | | Lab | Relays and Transistors | |  |  | |
| Week 15  04/27/22 | |  |  | | --- | --- | | Lecture | **Robot Interfacing**: H-Bridges | | Project | **Teams Work on NXT H-Bridge Project** | |  |  | |
| Week 16  05/04/22 | **Study Week Begins (H-Bridge Project Due)** |
| Week 17  05/11/22 | **Finals** |