**UNLV ME 425/625 – Robotics 1 Session 1002**

**Fall 2021 (last updated 08/20/21)**

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| Week | Topic |
| Week 1  08/24/21 | |  |  | | --- | --- | | Lecture | Introduction | |  |  | |
| Week 2  08/31/21 | |  |  | | --- | --- | | 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  09/07/21 | |  |  | | --- | --- | | Lecture | Simple Machines II: Cams, Springs and Linkages | | Lab | LEGO cams, springs and linkages | | Programming | LEGO NXC: ultrasonic and infrared sensors | |
| Week 4  09/14/21 | |  |  | | --- | --- | |  |  | | **No Class – Business Trip (AVATAR XPrize Competition)** | | |
| Week 5  09/21/21 | |  |  | | --- | --- | | Lecture | Simple Machines III: Ratchets, Drives and Gearing | | Lab | LEGO ratchets, drives and gearing | |  | ML-CAD (or Solidworks) | |  |  | |
| Week 6  09/28/21 | |  |  | | --- | --- | | 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 7  10/05/21 | |  |  | | --- | --- | |  | No Formal Class Teams Work on Automata Project | |  |  | |
| Week 8  10/12/21 | |  |  | | --- | --- | | Due: | Automata Presentation; Hardcopy Report Due | |  |  | |
| Week 9  10/19/21 | **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  10/26/21 | |  |  | | --- | --- | | Lecture | Motor Theory | | Programming | LEGO NXC: File handling Timers; Data Acquisition (Motor OL Step Response) | |
| Week 11  11/02/21 | |  |  | | --- | --- | | Lecture | **Robot Sensing**: ADC: binary, voltage dividers | | Lab | LEGO touch sensor; ohmmeter; potentiometer, voltmeter | |  |  | |
| Week 12  11/09/21 | |  |  | | --- | --- | | Lecture | **Robot Actuation**: ADC: operational amplifiers | | Lab | LEGO temperature sensing; DAC power supply; aliasing | |  |  | |
| Week 13  11/16/21 | |  |  | | --- | --- | | Lecture | **Robot Communications**: I2C | | Lab | LEGO PCF8574 LEDs, DIPs | |  |  | |
| Week 14  11/23/21 | |  |  | | --- | --- | | Lecture | **Robot Interfacing**: H-Bridges | | Lab | Relays and Transistors | |  |  | | |
| Week 15  11/30/21 | **Study Week Begins**  **Teams Work on NXT H-Bridge Project** |
| Week 16  12/07/21 | **Finals Begin** |