**UNLV ME 425/625 – Robotics 1 – Fall 2021 (last updated 09/28/21)**

|  |  |
| --- | --- |
| Week | Topic |
| Week 108/23/21 |

|  |  |
| --- | --- |
| Lecture | Introduction |
|  |  |

 |
| Week 208/30/21 |

|  |  |
| --- | --- |
| Lecture | Simple Machines I: Levers, Shafts and Cranks |
| Lab | LEGO levers, shafts and cranks |
| Programming | LEGO NXC: hello world, motors and touch sensor |
|  |  |

 |
| Week 309/06/21 | **Labor Day – UNLV Holiday** |
| Week 409/13/21 |

|  |  |
| --- | --- |
| Lecture | Simple Machines II: Cams, Springs and Linkages |
| Lab | LEGO cams, springs and linkages |
| Programming | LEGO NXC: ultrasonic and infrared sensors |
|  |  |

 |
| Week 509/20/21 |

|  |  |
| --- | --- |
| Lecture  | Simple Machines III: Ratchets, Drives and Gearing |
| Lab | LEGO ratchets, drives and gearing |
|  | ML-CAD (or Solidworks) |
|  |  |

 |
| Week 609/27/21 |

|  |  |
| --- | --- |
| Lecture/Lab | Putting it all together: Automata Examples (The Gymnast)  |
|  | Email: Team’s proposed Project |
| ProgrammingProject | ~~LEGO NXC: File handling~~Teams Begin Work on Automata Project |
|  |  |

 |
| Week 710/04/21 | No Formal ClassTeams Work on Automata Project |
| Week 810/11/21 |

|  |  |
| --- | --- |
| Due:  | Automata Oral Presentation; Hardcopy Report Due |

 |
| Week 910/18/21 | **Midterm**

|  |  |
| --- | --- |
|  | Part 1 Closed-book (60-min): Fill-in-the-blanks, essays, etc |
|  | Part 2 Open-book (90-min): Hands-on LEGO construction |

 |
| Week 1010/25/21 |

|  |  |
| --- | --- |
| Lecture | Motor Theory |
| Programming | LEGO NXC: File handling Timers; Data Acquisition (Motor OL Step Response) |

 |
| Week 1111/01/21 |

|  |  |
| --- | --- |
| Lecture | **Robot Sensing**: ADC: binary, voltage dividers |
| Lab | LEGO touch sensor; ohmmeter; potentiometer, voltmeter |
|  |  |

 |
| Week 1211/08/21 |

|  |  |
| --- | --- |
| Lecture | **Robot Actuation**: ADC: operational amplifiers |
| Lab | LEGO temperature sensing; DAC power supply; aliasing |
|  |  |

 |
| Week 1311/15/21 |

|  |  |
| --- | --- |
| Lecture | **Robot Communications**: I2C |
| Lab | LEGO PCF8574 LEDs, DIPs |
|  |  |

 |
| Week 1411/22/21 |

|  |  |
| --- | --- |
| Lecture  | **Robot Interfacing**: H-Bridges |
| Lab | Relays and Transistors |
|  |  |

 |
| Week 1511/29/21 | **Study Week Begins****Teams Work on NXT H-Bridge Project** |
| Week 1612/06/21 | **Finals Begin****Project Due** |