**UNLV ME 425/625 – Robotics I**

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

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| Week | Topic |
| Week 101/19/22 |

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| Lecture | Introduction |
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| Week 201/26/22 |

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| Lecture | Simple Machines I: Levers, Shafts and Cranks |
| Lab | LEGO levers, shafts and cranks |
| Programming | LEGO NXC: hello world, motors and touch sensor |
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| Week 302/02/22 |

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

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| Week 402/09/22 |

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| Lecture  | Simple Machines III: Ratchets, Drives and Gearing |
| Lab | LEGO ratchets, drives and gearing |
|  | ML-CAD (or Solidworks) |
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| Week 502/16/22 |

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| Lecture/Lab | Putting it all together: Automata Examples (The Gymnast)  |
|  | Email: Team’s proposed Project |
| ProgrammingProject | LEGO NXC: File handling**Teams Work on Automata Project** |
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| Week 602/23/22 | **Team work on their Automata Projects – No Formal Class** |
| Week 703/02/22 |

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| Due:  | **Automata Presentation; Report Due** |

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| Week 803/09/22 | **Midterm**

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

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| Week 903/16/22 | **Spring Break** |
| Week 1003/23/22 |

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

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| Week 1103/30/22 |

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| Lecture | **Robot Sensing**: ADC: binary, voltage dividers |
| Lab | LEGO touch sensor; ohmmeter; potentiometer, voltmeter |
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| Week 1204/06/22 |

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| Lecture | **Robot Actuation**: ADC: operational amplifiers |
| Lab | LEGO temperature sensing; DAC power supply; aliasing |
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| Week 1304/13/22 |

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| Lecture | **Robot Communications**: I2C |
| Lab | LEGO PCF8574 LEDs, DIPs |
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| Week 1404/20/22 |

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| Lecture  | **Robot Interfacing**: H-Bridges |
| Lab | Relays and Transistors |
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| Week 1504/27/22 |

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| Lecture  | **Robot Interfacing**: H-Bridges |
| Project | **Teams Work on NXT H-Bridge Project** |
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| Week 1605/04/22 | **Study Week Begins (H-Bridge Project Due)** |
| Week 1705/11/22 | **Finals** |