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

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

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| Week | Topic |
| Week 108/24/21 |

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| Lecture | Introduction |
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| Week 208/31/21 |

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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 309/07/21 |

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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 409/14/21 |

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| **No Class – Business Trip (AVATAR XPrize Competition)** |

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| Week 509/21/21 |

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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 609/28/21 |

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| Lecture/Lab | Putting it all together: Automata Examples (The Gymnast)  |
|  | Email: Team’s proposed Project |
| ProgrammingProject | LEGO NXC: File handlingTeams Work on Automata Project |
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| Week 710/05/21 |

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|  | No Formal ClassTeams Work on Automata Project |
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| Week 810/12/21 |

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| Due:  | Automata Presentation; Hardcopy Report Due |
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| Week 910/19/21 | **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 1010/26/21 |

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

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| Week 1111/02/21 |

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| Lecture | **Robot Sensing**: ADC: binary, voltage dividers |
| Lab | LEGO touch sensor; ohmmeter; potentiometer, voltmeter |
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| Week 1211/09/21 |

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| Lecture | **Robot Actuation**: ADC: operational amplifiers |
| Lab | LEGO temperature sensing; DAC power supply; aliasing |
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| Week 1311/16/21 |

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| Lecture | **Robot Communications**: I2C |
| Lab | LEGO PCF8574 LEDs, DIPs |
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| Week 1411/23/21 |

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| Lecture  | **Robot Interfacing**: H-Bridges |
| Lab | Relays and Transistors |
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| Week 1511/30/21 | **Study Week Begins****Teams Work on NXT H-Bridge Project** |
| Week 1612/07/21 | **Finals Begin** |