**UNLV ME 425/625 – Robotics 1 – Fall 2022 (last updated 08/25/22)**

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| Week | Topic |
| Week 108/29/22 |

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| Lecture | Introduction |
| Lab | BrixCC setup, NXC programming, Studio |
| Homework | NXC data types, if-then, loops, TextOut and FormatNumStudio: Casters |

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| Week 209/05/22 | **Labor Day – UNLV Holiday** |
| Week 309/12/22 |

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| Lecture | Simple Machines I: Levers, Shafts and Cranks |
| Lab | LEGO levers, shafts and cranks, Domabot |
| Programming | NXC: strings, motors (OnFwd, Rotate), Buttons, and touch sensor |
| Homework Additions | NXC: strings, strcount, strnum, etc Domabot touch sensor reactionStudio: Lift mechanisms; Grabbing things |

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| Week 409/19/22 |

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| Lecture | Simple Machines II: Cams, Springs and Linkages |
| Lab | LEGO cams, springs and linkagesUltrasonic Docking (no feedback) |
| Programming | NXC: ultrasonic and infrared  |
| Homework Additions | NXC: Domabot ultrasonic docking (shortest time)Studio: Reciprocating motions |

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| Week 509/26/22 |

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| Lecture  | Simple Machines III: Ratchets, Drives and Gearing |
| Lab | LEGO ratchets, drives and gearingPID ultrasonic docking (with feedback) |
| Programming | NXC Timers |
| Homework Additions | NXC: Domabot PID (shortest time)Studio: Gearing and drives |

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| Week 610/03/22 | **Project 1 Relay Race: Introduction**

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| Lecture/Lab | PID and Line Following |
| Programming | NXC Files |
| Homework Additions | NXC: Line Following (say in reverse direction)Studio: Ratchets |

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| Week 710/10/22 | **Project 1 Relay Race: PDR and Practice (No Formal Class)** |
| Week 810/17/22 | **Project 1 Relay Race: Competition Day** |
| Week 910/24/22 | **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 1010/31/22 |

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| Lecture | Motor Theory |
| Lab | Motor OL Step Response and Lego Winch |
| Programming | Arrays |
| Homework Additions | Motor current, torque and speed curves |

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| Week 1111/07/22 |

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| Lecture | **Robot Sensing and Actuation**: Numbering systems: voltage dividers, and op-amps |
| Lab | LEGO touch sensor; ohmmeter; potentiometer, voltmeter, and voltage supply (bulb/speaker) |
| Homework Additions | Light Dependent Resistor |
| Prelab | PCF8574 circuit |

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| Week 1211/14/22 |

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| Lecture | **Robot Communications**: I2C |
| Lab | LEGO PCF8574 LEDs, DIPs, Relays and Transistors, DC Motors |

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| Week 1311/21/22 | **Project 2 Something – Introduction**Some ideas: * Tube Push, Photovore, Braitenbeg Vehicles, Wall-Following
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| Week 1411/28/22 | **Project 2 Something – PDR and Practice** |
| Week 1512/05/22 | **Study Week Begins****Project 2 Something – Competition Day** |
| Week 1612/12/22 | **Finals Begin****Project Due** |