**UNLV ME 425/625 – Robotics 1 – Spring 2024 (last updated 01/03/24)**

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| Week | Topic |
| Week 101/22/24 |

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

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| Week 201/29/24 |

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| Lecture | Simple Machines I: Levers, Shafts and Cranks |
| Lab | LEGO levers, shafts and cranksDomabot: Introduction |
| Programming | NXC: strings, motors (OnFwd, Rotate), Buttons, and touch sensor |
| Homework | Levers, Shafts and CranksNXC programming strings and motorsStudio: Lift mechanisms; Grabbing thingsDomabot touch sensor reaction |

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| Week 302/05/24 |

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| Lecture | Simple Machines II: Cams, Springs and Linkages |
| Lab | LEGO cams, springs and linkages |
| Programming | NXC: Infrared light sensor Domabot: Line following Bang-Bang |
| Homework | Cranks, Cams, and LinkagesNXC: Line following with light sensorStudio: Reciprocating motionsDomabot: Line following – Bang-Bang |

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| Week 402/12/24 |

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| Lecture  | Simple Machines III: Ratchets, Drives and GearingLine Following PID (motivated from Bang-Bang) |
| Lab | LEGO ratchets, drives and gearingDomabot: Line following PID**Introduce Project 1 Semi-Finals Rules** |
| Programming | NXC Files |
| Homework | Ratchets, Drives, and GearingNXC: FilesStudio: Oscillating MechanismsDomabot: Line following PID |

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| Week 502/19/24 | **Presidents Day – UNLV Holiday (students use as PLR)** |
| Week 602/26/24 | **Project 1 Relay Race: Semi-Finals Competition Day** |
| Week 703/04/24 | **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 803/11/24 | **Spring Break – UNLV Holiday** |
| Week 903/18/24 |

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| Lecture | DC motor theory and open-loop step response |
| Lab | NXC File HandlingNXC TimersMotor Open-Loop Step ResponseNXC Ultrasonic Sensors |
| Homework | DC motor theory and open-loop step response NXC Timing |

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| Week 1003/25/24 |

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| Lecture | Electronics: Robot Sensing, Actuation and Communications |
| Lab | DIY Touch Sensor and Voltage SupplyRS-485 CommunicationsBluetooth Communications |
| Homework | Communications |

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| Week 1104/01/24 |

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| Lecture | Path-Planning (Mazes) Part 1: Wall-Following |
| Lab | Wall-Following PID Theory |
| Homework | Wall-Following and PID Theory |

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| Week 1204/08/24 |

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| Lecture | Path-Planning (Mazes) Part 2: Obstacle-AvoidanceObstacle-Avoidance PID Theory |
| Lab | Domabot: Obstacle Avoidance PIDMaze Solving |
| Homework | Domabot: Obstacle AvoidanceMazeProp Mount |

**Introduce: Project 2 – Competition Finals****Form Teams** |
| Week 1304/15/24 |

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| Lecture | **Project 2 Finals PDR and Practice** |
| Lab |  |
| Homework |  |

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| Week 1404/21/24 | **Project 2 Relay Race Finals** |
| Week 1504/29/24 | **Study Week Begins** |
| Week 1605/06/24 | **Finals Begin** |