**UNLV ME 425/625 – Robotics 1 – Fall 2023 (last updated 11/10/23)**

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| Week | Topic |
| Week 108/28/23 |

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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 209/04/23 | **Labor Day – UNLV Holiday** |
| Week 309/11/23 |

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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 409/18/23 |

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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 509/25/23 |

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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 610/02/23 | **Project 1 Relay Race PLR Day (no lecture)** |
| Week 710/09/23 | **Project 1 Relay Race: Semi-Finals Competition Day** |
| Week 810/16/23 | **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 910/23/23 |

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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 responseNXC Timing |

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| Week 1010/30/23 |

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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 1111/06/23 |

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

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| Week 1211/13/23 |

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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 - Finals****Form Teams – 2 people per team** |
| Week 1311/20/23 | **No Lecture:** Teams demonstrate can navigate Everblock MazeHomework: None |
| Week 1411/27/23 | **No Lecture**: Course Revealed and **PDR** (demonstrate wall-following and obstacle avoidance robots)Homework: None |
| Week 1512/04/23 | **Study Week Begins****Project 2 Relay Race Finals** |
| Week 1612/11/23 | **Finals Begin** |