**3D Prototyping Module**

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| **Deliverables** | | **Points** | **File ID** |
| 1. | Completed Design Controls Worksheet | 30 | DCW-1 |
| 2. | Prototyping Protocol | 30 | PP-1 |
| 3. | Arduino Code incl UI upgrades | 15 |  |
| 4. | Functional Micropump | 10 |  |
| 5. | CAD Package | 15 |  |

All deliverables due: 2/13/2020 11:59 PM, Canvas Upload

**Rubric: Design Controls Worksheet**

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| --- | --- | --- |
| **ID** | **Section / Task** | **Points** |
| D1 | Improvements on existing design narrative complete. Design goals clearly defined. | 5 |
| D2 | User Needs Matrix complete. | 5 |
| D3 | Requirements Matrix completed using proper language and grammatical constraints. | 5 |
| D4 | Design Outputs Matrix complete. | 5 |
| D5 | Verification Matrix complete. | 5 |
| D6 | Validation Matrix complete. | 5 |
|  | **Total** | **30** |

**Rubric: Prototyping Protocol**

|  |  |  |
| --- | --- | --- |
| **ID** | **Section / Task** | **Points** |
| P1 | All sections complete / no grey text, all fields complete. | 2 |
| P2 | Protocol Description accurately describes the part being built with this protocol | 3 |
| P3 | 3D Printer Settings: Successfully completed translating 3D printer settings into protocol document with clear / proper formatting. | 4 |
| P4 | Spelling and grammar / properly formatted citations and references if applicable. | 1 |
|  | **Total** | **10** |

**Rubric: Arduino Code Including UI Upgrades**

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| --- | --- | --- |
| **ID** | **Section / Task** | **Points** |
|  | All functions, variables and code sections have meaningful and complete commenting | 2 |
|  | Use of “delay” functions is limited to short delays or eliminated | 2 |
|  | Code is capable of using inputs for volumetric flowrate and tubing geometry to set motor control variables in system. | 3 |
|  | Code defaults to some default values in case user does not enter text in UI. | 2 |
|  | Code written as Functionalized Program; main loop contains minimum instructions. | 2 |
|  | Valid tests have been written and results of tests have been documented. (Ad-hoc or Unit) | 2 |
|  | Spelling and grammar / properly formatted citations and references if applicable. | 2 |
|  | **Total** | **15** |

**Rubric: Functional Micropump**

|  |  |  |
| --- | --- | --- |
| **ID** | **Section / Task** | **Points** |
|  | TA or Instructor has been shown that your micropump circuit / software work. | 10 |
|  | **Total** | **10** |

**Rubric: CAD Package**

|  |  |  |
| --- | --- | --- |
| **ID** | **Section / Task** | **Points** |
|  | CAD Assembly including all parts and hardware | 2 |
|  | Assembly Drawing including BOM | 4 |
|  | One drawing per part, 2x parts | 4 |
|  | ANSI-A size | 2 |
|  | Dimensioned / Annotated Correctly | 3 |
|  | **Total** | **15** |