**3D Prototyping Module**

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| **Team Deliverables** | | **Points** | **File ID** |
| 1. | Completed Design Controls Worksheet | 30 | DCW-1 |
| 2. | Prototyping Protocol | 30 | PP-1 |
| 3. | Test Protocol | 15 | TP-1 |
| **Individual Deliverables** | | **Points** |  |
| 4. | Arduino Code incl UI upgrades | 15 |  |
| 5. | Functional Micropump (Individual Grade and Upload) | 10 |  |
|  |  |  |  |
| **Due Dates** | |  |  |
| Team Deliverables (Canvas upload) | | 4/6/2020 | 11:59PM |
| Individual Deliverables Canvas upload) | | 4/6/2020 | 11:59PM |
|  |  |  |  |

**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**

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| **ID** | **Section / Task** | **Points** |
| P1 | All sections complete / no grey text, all fields complete. | 6 |
| P2 | Protocol Description accurately describes the part being built with this protocol | 10 |
| P3 | Materials / Tools and equipment section accurately identifies the necessary items needed to prototype the device / design. | 4 |
| P4 | Drawing or rendering or image of prototype included as a figure with caption and relevant labeling to allow reader to understand the prototype being built included | 6 |
| P5 | Spelling and grammar / properly formatted citations and references if applicable. | 4 |
|  | **Total** | **30** |

**Rubric: Test Protocol**

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| **ID** | **Section / Task** | **Points** |
| T1 | All sections complete / no grey text, all fields complete. | 2 |
| T2 | Protocol Description accurately describes the test that is designed within this protocol. | 5 |
| T3 | Materials / Tools and equipment section accurately identifies the necessary items needed to prototype the device / design. | 2 |
| T4 | Table for data acquisition clearly defined. Table includes areas needed for recording all relevant settings and test data. This is currently defined in the template as the “Machine Settings” and “Values to be Recorded” sections. Change this table or create additional tables to capture your settings and test data. | 4 |
| T5 | Spelling and grammar / properly formatted citations and references if applicable. | 2 |
|  | **Total** | **15** |

**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**

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