Project 3.2.4 Machine Control Design Rubric

Total Points _____/120

Physical Solution (15 points)

Topics	5 points	4 points	2 points	1 point
Design Requirements	Fully meets design requirements.	Meets most design requirements and supports the design function.	Meets some requirements but not enough to support the design function.	Does not meet design requirements.
Quality & Functionality (x2)	Mechanism functions correctly, consistently, and the chosen parts are appropriate.	Mechanism functions most of the time, and the chosen parts are appropriate.	Mechanism sometimes functions, and the parts are not chosen appropriately.	Mechanism rarely functions, and the parts are not chosen appropriately.

Programming Solution (15 points)

Topics	5 points	4 points	2 points	1 point
Design Requirements	Fully meets design requirements.	Meets most design requirements and supports the design function.	Meets some requirements but not enough to support the design function.	Does not meet design requirements.
Quality & Functionality (x2)	Works correctly, consistently, and commands are well chosen. Well-annotated to clearly indicate program functions.	Works most of the time, and most commands are well chosen. Annotated to indicate program functions.	Works inconsistently, and most commands are well chosen. Missing many annotations.	Contains errors as a result of poorly chosen commands. No annotations provided.

Individually Scored Items (20 points)

Topics	4 points	3 points	2 points	1 point
Design Brief & Brainstorm Sketches (x2)	**In POE notebook:** Section clearly titled with notes on design brief. At least one viable solution presented in brainstorming ideas. Sketch is neatly drawn and carefully annotated for clear understanding. Associated flowchart for programming is included that clearly conveys how the program will run the proposed solution.	**In POE notebook:** Section titled with notes on design brief. At least one viable solution presented in brainstorming ideas. Sketch is drawn and annotated. Associated flowchart for programming is included.	**In POE notebook:** Section titled with notes on design brief. At least one viable solution presented in brainstorming ideas.	**In POE notebook:** Section titled with notes on design brief. At least one solution presented in brainstorming ideas.
Project Log	**In POE notebook:** Provides a neat and accurate description of tasks completed each day with specific **details** about **personal contributions** to the project. Complete sentences used.	**In POE notebook:** Provides an accurate description of tasks completed each day with specific details about personal contributions to the project.	**In POE notebook:** Provides a description of tasks completed each day.	**In POE notebook:** Provides a description of tasks completed in the project.
Conclusion Questions	**In POE notebook:** All questions answered thoroughly and correctly with full explanation demonstrating mastery of concepts learned.	All questions answered correctly with explanation demonstrating concepts learned.	Most questions answered but incorrectly or lacking explanation demonstrating concepts learned.	Some questions answered but lacking explanation and demonstrating concepts learned.
Teamwork	Worked well with other team members and settled differences in a positive manner. Down time used productively and never off-task. Group responsibilities form and Gantt chart completed thoroughly and reflect the team's actual responsibilities. Tasks are divided equally across team members.	Demonstrated good team working skills the majority of the time. Down time used productively, but off-task occasionally. Group responsibilities form and Gantt chart completed and tasks are divided equally across team members.	Demonstrated good team working skills part of the time. Down time not used productively and off-task often. Group responsibilities form and Gantt chart completed.	Demonstrated few team working skills. Off-task most of the time.

Electronic Documentation (70 points)

Topics	5 points	4 points	2 points	1 point
Professional Appearance	Includes all required sections; includes page numbers and appropriate section headings. Font and spacing choices are appropriate for each type of text and consistent throughout document.	Includes most required sections; includes page numbers and appropriate section headings. Font and spacing choices are appropriate.	Does not include all required sections; includes page numbers; section headings could have been better organized. Font and spacing choices not appropriate.	Missing many sections; does not have page numbers or section headings. Lack of care put into layout and organization.
Title Page & Table of Contents	Includes all components required for a complete title page and table of contents. Page numbers and sections are consistent and accurate.	Includes 80% or more of the necessary components for a complete title page and table of contents. Some page numbers or sections are inaccurate.	Includes 60% or more of the necessary components for a complete title page and table of contents. Many page numbers or sections inaccurate.	Title page and table of contents unorganized and inaccurate.
Design Brief	Is grammatically correct and includes a clear and concise description of the problem and design statement; all constraints and deliverables listed neatly.	Is grammatically correct; problem and design statement unclear; all constraints and deliverables listed.	Has some grammar mistakes; problem and design statement unclear; missing some constraints and deliverables.	Has many grammar mistakes; missing many important parts of the design brief
Brainstorming Ideas	Produces one viable and accurate pictorial sketch **and** program flowchart of the required design concept **per group member**. Each is properly detailed for effective communication, including descriptions, labels, and signatures.	Produces 1 marginally sufficient and accurate pictorial sketch and program flowchart of the required design concept per group member. Each is marginally detailed for effective communication, including descriptions, labels, and signatures.	Produces sketches and program flowcharts that are difficult to visualize. Lacks details in sketches such as descriptions, labels, and signatures.	Produces incomplete sketches and program flowcharts. Does not present concept. Missing most descriptions.
Decision Matrix	Effectively demonstrates important considerations and clearly communicates the process that contributes to selecting a final solution.	Somewhat effectively demonstrates important considerations and the process that contributes to selecting a final solution.	Is missing elements that should have been considered for selecting a final solution.	Is missing elements that should have been considered for selecting a final solution, and poorly communicates the final solution selection process.
Matrix - Assignment & Justification	A logical, well-explained method of evaluating each specification or constraint for each of the listed possibilities is presented to the reader of the matrix. Paragraph justifying initial choice clearly explains the benefit of design chosen.	A method of evaluating each specification or constraint for each of the listed possibilities is used. An attempt to explain it is made but is unclear to the reader of the matrix. Paragraph justifying initial choice explains the benefit of design chosen.	Each specification or constraint for each of the listed possibilities is assigned an evaluation, but no attempt is made to present it to the reader of the matrix. Paragraph justifying initial choice not included.	Each specification or constraint for each of the listed possibilities is either assigned an apparently random value or is not evaluated at all. Paragraph justifying initial choice not included.
Proposed Design (x3)	Proposed design is represented clearly and with detail through Inventor/Fusion 360 models. Multiple useful views are provided with annotations that describe the intended solution well. Pseudocode is well-written and clearly identifies the steps needed in the program to make the machine function as intended.	Proposed design is represented with detail through Inventor/Fusion 360 models. Multiple views are provided that describe the intended solution well. Pseudocode clearly identifies the steps needed in the program to make the machine function as intended.	Proposed design is represented through Inventor/Fusion 360 models. Multiple views are provided that describe the intended solution. Pseudocode identifies the steps needed in the program to make the machine function.	Proposed design is represented through Inventor/Fusion 360 models. Single view is provided but lacking in details. Pseudocode included.
Modification Sketches & Description (x2)	**All changes** made to the original design solution (both physical **and** program) are clearly communicated through sketches **and** explanations. Sketches include labels, signatures, and dates.	Most changes made to the original design solution (both physical and program) are somewhat clearly communicated through a sketches and explanations. Sketches include labels, signatures, and dates.	Some changes made to the original design solution (both physical and program) are poorly communicated through a sketches and explanations. Sketches include labels, signatures, and dates.	Some changes made to the original design solution are communicated through a sketches and explanations. Sketches include most labels, signatures, and dates.
Final Physical Solution	Solution is accurately portrayed as high-quality sketch, electronic model, or photographs. **Multiple views** used to clearly highlight all physical aspects of the machine. Is properly detailed for effective communication, including labels and descriptions.	Solution is portrayed as high-quality sketch, electronic model, or photographs. Is properly detailed for effective communication, including labels and descriptions.	Solution is portrayed as high-quality sketch, electronic model, or photographs, but lacks details for effective communication, such as labels and descriptions.	Produces incomplete sketches, models, or photographs. Does not present the concept well. Missing several details for effective communication, including labels and descriptions.
Final Program	Screen shot(s) of final program provided and clearly displayed. Program is well-organized with proper annotation that precisely describes the flow of the program.	Screen shot(s) of final program provided. Program is organized with proper annotation that describes the flow of the program.	Screen shot(s) of final program provided. Program contains annotation that describes the flow of the program.	Screen shot(s) of final program provided, but missing some parts. Program is not organized or missing annotation that describes the flow of the program.
Key Contributors	One section per team member included that describes fully and accurately the contributions made by each individual. Grammar, spelling, and punctuation are correct.	One section per team member included that describes accurately the contributions made by each individual. Grammar, spelling, and punctuation are mostly correct.	One section per team member included that describes the contributions made by each individual. Some grammar, spelling, and punctuation mistakes are present	One or more team member missing contributions sections. Many grammar, spelling, and punctuation mistakes are present.