

CS450HO – Robotic Design & Fabrication Honors

Technical Report Rubric

In this document I will show you how to create a technical report for your design projects. The report will show you how to insert a table of contents, list of table and figures, how to caption your tables and figures as well as how to insert sections into your report. I will also list what to include in each section so you know what to write!

This report will be graded out of 100 points.

STEP 1: COVER PAGE

- Include a report title centered at top of page
- Include class name and code (CS450HO – Robotics Design and Fabrication Honors)
- List names team members and forms
- List date submitted
- Insert page numbers
 - Insert → Page number → bottom center of page

FRC 2017 Steamworks – Gear Floor Pick Up Mechanism Design

CS450HO – Robotics Design and Fabrication Honors

Dee Clark (older form) and Cameron Wilhelm (old form)

November 2, 2021

IMAGE OF MECHANISM HERE

STEP 2A: TABLE OF CONENTS

- Navigate to References → Table of Contents (top left corner) → Classic
- Will not populate until section headers are inserted

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STEP 2B: LIST OF FIGURES & TABLES

- Navigate to References → Insert Table of Figures → Select Figures
- Navigate to References → Insert Table of Figures → Select Tables
- Will not populate until tables/figures are inserted and properly captioned

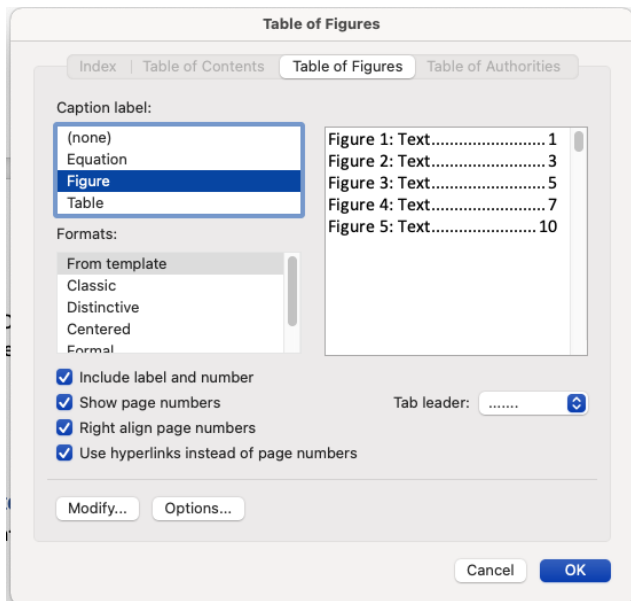


Figure 1: Strategic & Functional Analysis Spreadsheet5

Figure 2: Bill of Materials..... 7

Table 1: Testing Date Sample Table8

STEP 3: INTRODUCTION

- In this section you will introduce the project challenge and provide background information on the FRC 2017 Steamworks game
- Info to include
 - Summary of project and design constraints you needed to work around
 - Brief description of FIRST as a program
 - Describe how Steamworks game was played
 - List any existing solutions you used as inspiration for your design
- How to insert a section header
 - Navigate to Home tab
 - In middle select “Heading 1” and type title of heading
 - Press enter and begin writing text below header

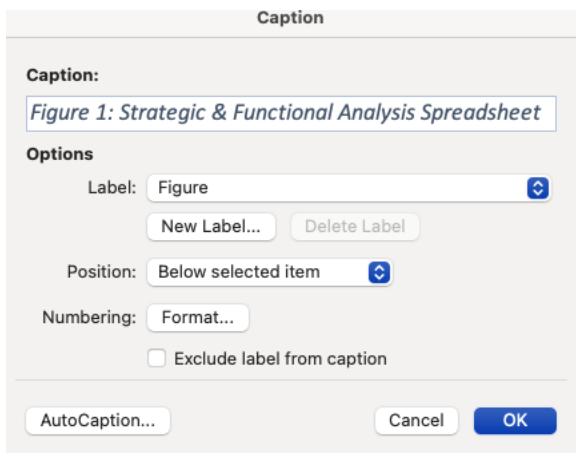


Introduction

INTRO TEXT HERE

STEP 4: STRATEGIC AND FUNCTIONAL REQUIREMENTS DESIGN ANALYSIS

- In this section you will be writing about the strategic and functional analysis spreadsheet you completed at the beginning of this project
- Describe the purpose of a strategic and functional analysis at the beginning of a mechanical design project
- List your strategic and functional requirements
- Explain how your design evolved from this original analysis
- Include an image of your completed spreadsheet
- How to insert a caption
 - Right click image and select “Insert Caption”
 - Select type (figure or table) and list a name



Strategic and Functional Requirements Design Analysis

TEXT HERE

Interstellar Accuracy	
Strategic Requirements	Functional Requirements
Acquire and shoot Power Cells efficiently	Robot needs to be able to hold 3 Power cells and shoot in rapid succession Robot needs to be able to intake 3 Power cells consistently from max. 2 people
Needs to be accurate from all ranges of the field	Robot needs to have trajectory adjustability based on range and angle
Robot needs to be able to move on field	Robot needs a drivetrain
Robot needs to be stationary while shooting	Robot needs a drivetrain that can stop
Priority Ranking	
Robot needs a drivetrain	
Robot needs a high traction drivetrain	
Robot needs to be able to hold 3 Power cells and shoot in rapid succession	
Robot needs to be able to intake 3 Power cells consistently from max. 2 people	
Robot needs to have trajectory adjustability based on range and angle	
Robot needs to have strafing ability/holonomic drive	
Robot needs to have "stealth mode" for fine tuning adjustments (low speed mode)	

Figure 1: Strategic & Functional Analysis Spreadsheet

STEP 5: COMPUTER AIDED DESIGN PROCESS

- In this section you will describe how you created your design in the Onshape CAD software
- Define “CAD” and briefly discuss the Onshape software and how it works
- Discuss modeling techniques you used (simple 2D sketches, 3D extrusions, pattern tools, mirror tools, etc.)
- Describe assembly tools you used (types of mates, pattern tools, mirror tools, etc.)
- Describe MKCAD and how you used that in your assembly
- Include a final render of your CAD design
- Feel free to include other images (annotated 2D sketch you started with, other detailed views, part drawings, etc.)
- Caption all images

Computer Aided Design Process

TEXT HERE

STEP 6: MANUFACTURING & ASSEMBLY

- In this section you will describe how you manufactured your designs and assembled them
- List the machines you used and include brief descriptions of how they work
- Describe any issues you ran into during manufacture and/or assembly and how you resolved these issues
- Include progress images of the manufacture and build
- Include an image of the final assembled design
- Include a image of your Bill of Materials

Manufacturing & Assembly

TEXT HERE

Part Number	Name/Description	Price	Quantity	Total Price	Vendor	Link	
91251A340	10-32 x 3/8" bolts, 100 pack	12.28	1	12.28	McMaster Carr	https://www.mcmaster.com/screws/socket-head-screws/thread-size-10-32/socket-head-screws-6/allow-steel/socket-head-screws-8/	EXAMPLE

Figure 2: Bill of Materials

STEP 7: TESTING SETUP & RESULTS

- In this section you will describe the setup you used to test your design (ex: old drivebase, 2020 robot with control system/pneumatics)
- Include image(s) of testing setup
- Describe how your design performed
 - Strengths and weaknesses
- Describe how you would iterate your design to overcome any design weaknesses observed during testing

Testing Setup & Results

TEXT HERE

Table 1: Testing Date Sample Table

STEP 8: CONCLUSION

- In this section you will restate the project description from the introduction
- Briefly summarize your CAD modeling process, manufacturing, assembly and testing
- Briefly summarize testing results and how you would improve design in future
- List 3 major lessons your learned from this project, and any feedback you have to improve it next year!

Conclusion

Text here

STEP 9: WORKS CITED

- List any sources you used below in APA format
- Your works cited should include the following at a minimum:
 - NASA RAP Guide
 - FRC Steamworks Game Manual
 - Resources from past 2017 designs you used
- Include in text citations (AUTHOR, YEAR) format
- Citation Generator: <https://www.citationmachine.net/apa>

Works Cited

CITATIONS HERE, APA FORMAT