

Mission . . . Robotics

You have been arranged into an elite group of special agents. Your mission, if you choose to accept it, is to design and build a Robotic Arm system. This robotic arm system will be used to perform dangerous tasks that challenge our agents in the field every day. I will be looking for only the best prototypes to be purchased by the agency. Good luck . . .

This message will self-destruct in 10 seconds . . .

Top Secret

CPE hour code: _____

Mission: Robotics

Tech Lab
Mr. Bush
Mr. Sartori

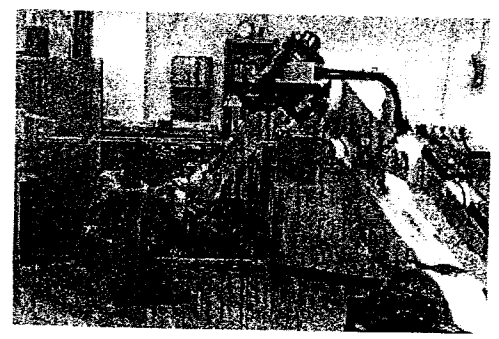
Robotic Group Name:

Name(s): _____

Date: _____

Technology Challenge: Identify the Problem:

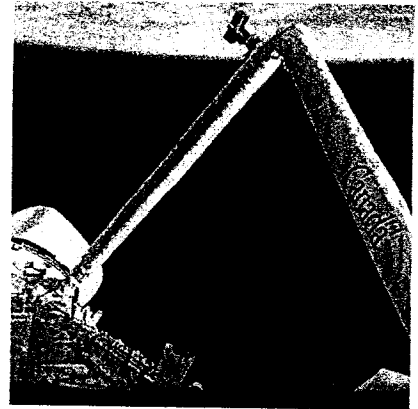
- **Build a Robotic Arm system!**



Some details to consider:

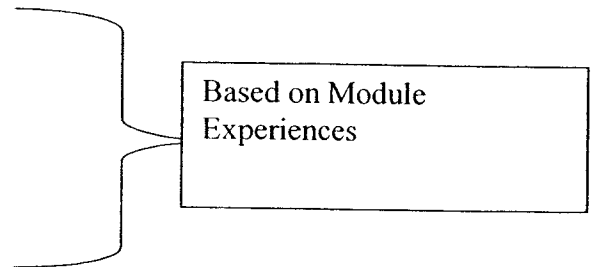
The system must:

- Perform a minimum of 3 tasks:
 - Place a ball in a container
 - Stack 2 blocks onto each other
 - To be determined. . .
- Have at least 3 moving parts (joints)
- Be drawn using CAD software
- Be accompanied by a “Product Brochure” used to promote your Robotic system



Other:

- We will be demonstrating the operation of your Robotic system to the class at the end of the project.
- We will be working in teams of 4 or 5
- Teams will be comprised of:
 - 1-Robotics specialist
 - 1-Fluid Power specialist
 - 1-Mechanical Power specialist
 - 1-CAD specialist
- This will be a 2 rotation project (2 weeks)



Set Goals for the Arm! (Use complete sentences)

Goal 1 –
Goal 2 –
Goal 3 –
Goal 4 –

Create Ideas: Brainstorming

Use these pages to brainstorm at least 3 ideas to solve the problem.





Select the Best Solution: *Design Matrix*

- Complete the Design Matrix to determine the best solution / idea to solve the problem.

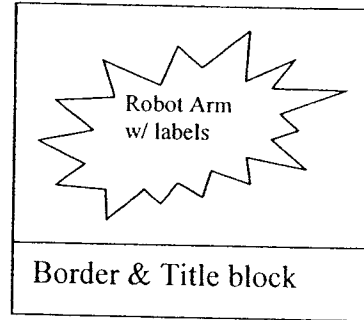
4 – meets perfectly 3 – meets well 2 – meets somewhat 1 – meets minimally 0 – does not meet	Solution 1	Solution 2	Solution 3
Totals:			

**Get design approval
from the instructor and
then TIME TO BUILD!**

Final Design Drawing

Using the CAD software draw the final product (design)

- Make the drawing as detailed as possible
- Label the parts and materials on the drawing
- Include a Border and Title block



Brochure:

Create a Promotional Brochure of your Robotic Arm using Microsoft Word or Publisher (examples will be given at a later time).

You should include:

- At least 2 digital pictures of your robot.
- Your group (company) name.
- A creative name or title for your robot.
- A list of the Tasks your robot was designed for.
- A diagram of your robot's work envelope (see robotics specialist for details or p. 186 in Technology book).



Hour Code

CAREER PREPARATION & EXPLORATION RUBRIC FOR COOPERATIVE ROBOTIC PROJECT

Group Name: _____

Date: _____

Group Members: _____

Robot

Task Number One

(Team will place ball in a cup)

	2	4	6	8	10
Inable to perform task	Performs task with difficulty or human intervention		Performs task with little difficulty or with little human		Performs task quickly and efficiently with no human intervention

Task Number Two

(Team will stack two blocks)

	2	4	6	8	10
Inable to perform task	Performs task with difficulty or human intervention		Performs task with little difficulty or with little human		Performs task quickly and efficiently with no human intervention

Fit and finish - Overall appearance

Quality of build: [example] rounded edges, sanded, parts fit well and move smoothly, quality design and fabrication attributes)

	1	2	3	4	5
oor construction/appearance	Average construction average quality finishing with average quality assembly		Shows several attributes of good finishing and good quality assembly		High quality construction with high quality finishing and high quality construction

Form and Function

Overall function: does the robot use the principles of engineering developed in this course; Fluid Power, Mechanical Power, Problem Solving, Robotics etc.)

	1	2	3	4	5
oor function	Average function; some application of engineering principles		Good Function; with several applications of engineering principles		High-level function; with many applications engineering principles

Robotic presentation

(Does the team show and operate the robot well?)

0	2	4	6	8	10
No explanation of functions and poor operation	Some explanation of function and average operational skill		Explanation of function and good operational skills		Explanation of function and strong operational skills

Overall Project Build

(Does the end product reflect team effort and commitment to the project?)

0	2	4	6	8	10
Robot show minimal team effort was applied	Robot shows average team effort		Robot shows strong team effort and commitment		Robot show outstanding team effort and commitment

Total Robot Points - _____

50

Equals = _____ Percent

Brochure

Titles and Names

(Does the brochure contain the company name, robot name and information about the group and company?)

0	1	2	3	4	5
No company or robot name		Some information with company/ robot name and group members	Most information with company/robot name and group members		Complete information with company/robot w name and group members

Work Envelope

Does the brochure CLEARLY define the work envelope?)

0	1	2	3	4	5
No work envelope detail		Adequate work envelope explanation	Work envelope defined with good detail		Extremely clear work envelope with Details

Tasks

Does the brochure explain the tasks that the robot was designed for?)

0	1	2	3	4	5
Does not explain tasks		Explains some tasks	Accurately explains tasks		Explains all tasks clearly with features/benefit or functions

Pictures

Does the brochure contain pictures clearly show the robot, the team and/or operation?)

0	1	2	3	4	5
No pictures		One picture/ Some detail or two pictures No detail or clarity	Two pictures some detail/clarity		Two pictures good detail/clarity

Overall Brochure Quality

Does the brochure look professional?)

0	2	4	6	8	10
No brochure		Substandard brochure little detail	Good brochure show some information of company, shows "need to buy" company information		Demonstrates highest quality brochure shows information "need to buy" company information

Total Brochure Points (30 Possible) _____

C.A.D. Drawing

Accuracy

(Does the drawing represent the actual robot?)

0	1	2	3	4	5
No drawing	Drawing with some resemblance to robot		Drawing with good resemblance to robot		Drawing with strong resemblance to robot

Dimensions and/or Labels

(Is the drawing properly dimensioned and/or does it include appropriate labels?)

0	1	2	3	4	5
No labels or dimensions	Some dimensions and/or labels		Most dimensions and/or labels		Well Dimensioned and/or labeled

Titles and Borders

(Is there a boarder and is all of the necessary information included in the title block?)

0	1	2	3	4	5
No boarder or title box	Incomplete boarder and title box		Boarder and title box with some information		Border and complete title box

Total C.A.D. Drawing Points (15 Possible) _____

Total Team points _____

Total Techfolio Points (30 Possible) _____

Total Robot Points (100 Possible) _____

Total Brochure Points (30 Possible) _____

Total C.A.D. Drawing Points (15 Possible) _____

Total Team Project Points (175 Possible) _____

Note individual points for this assignment include:

Safety sheets (10 points)

Work log week one (20 points)

Work log week two (20 points)

Peer grade (15 points)

Total possible points for robotic project individual and team 240 points