IME 100: Interdisciplinary Design and Manufacturing

Robot Re-Design Project

Your Mission: To redesign, program, and control a VEX robot to play the game

As a team, you will design, build, and program a vex robot. You will first assemble and program the VEX Clawbot. Once you have mastered the basics, you will complete a full redesign of the robot. Friendly competitions will provide some fun along the way.

To begin, you must join a group on Blackboard where you will maintain and submit documents.

Part 0: Team Structure (10 points)

Project team formation. Due Week 2

Deliverables:

0.1 Team Organizational Structure, including Roles and Responsibilities.
0.2 Performance Criteria
0.3 Participation Policy
0.4 Conflict Resolution Policy
0.5 Final Team Peer Assessment Rubric [Will be provided on Blackboard, **must be resubmitted**]

Part I: Original Design (25 points)

Assemble the VEX EDR V5 Robot. Program the robot for hand-control and demonstrate your robot's abilities by performing basic tasks. Due Week 3

Deliverables:

1.1 Hand Controller Manual, including Operating Instructions	[5]
1.2 Design Log Template, including original design as a first entry	[5]
1.3 Bill of Materials Template with original design materials	[5]
1.4 VEX VR challenge	[10]

Part II: Full Re-Design (40 points)

At least three additional parts/components must be added to the design, at least two of which must be manufactured. Manufactured parts must meet an approved level of complexity. A full set of engineering drawing must be provided for any manufactured parts. Due Finals Week

Deliverables:

2.0 Design Log	[10]
2.1 Design Summary, including functionality of additional components	[5]
2.2 Innovation Statement (Uniqueness of your robot and/or programming)	[2.5]
2.3 Manufacturing Complexity Statement (Challenges faced in manufacturing the new components)	[2.5]
2.4 Bill of Material	[5]
2.5 Detailed Engineering Drawings for Manufactured Components	[5]
2.6. Group reflection (Include competition scores)	[5]
2.7 Link to Website portfolio with all of the above files	[5]

Extra Credit

Complete a full CAD model of the re-designed robot. [Due Finals Week] [5]
CAD file of original BOT https://www.vexrobotics.com/v5-classroom-super-kit.html#cad

Approximate Schedule:

Week 1: Form groups, establish team policies, distribute/label vex kits, start building and programming!
Weeks 2-8: Design, build and program the custom robot
Week 2: Part 0 Due
Week 3: Part 1 Due
Week 4: VR Showdown
Week 6: Mock Competition
Week 9: Sectional Competition
Week 10: Grand Finals and Disassembly