PROJECT MANAGEMENT

Team Members and Roles:

Electric Systems Specialist:

Responsible for the electronics, programming and any custom software for the mechanisms that suit the team's requirements and identity.

Innovations & Creativity Manager:

Responsible for media management and investigating where unconventional strategies can be implemented for optimization of the car.

Mechanical Design Strategist:

Responsible for ensuring that the design of the vehicle was enough to fulfill the technical criteria whilst maintaining the appropriate aesthetic.

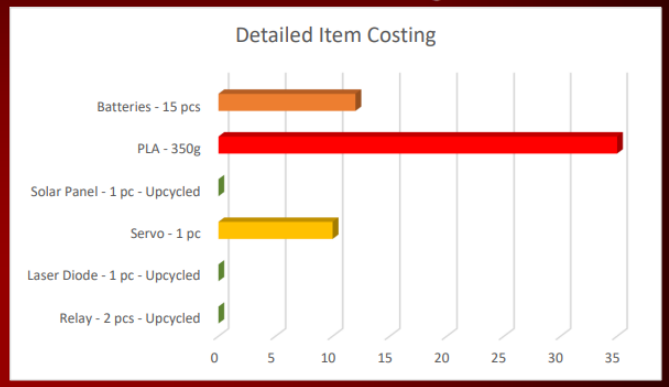
Material & Fabrication Engineer:

Responsible for analyzing the best-suited materials for the project and assessing the most suited methods of assembling the vehicle.

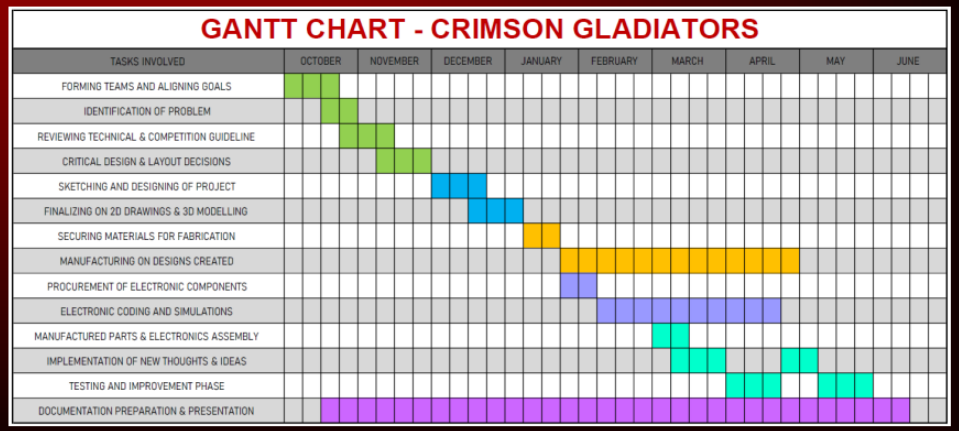
Team Budget Planning:

The team budget was split according to the following table and the total cost required was AED 57 only, which includes spares!

Detailed Item Costing



After sessions of brainstorming, it was identified that the vehicle must be able to emulate real-life scenarios and be optimized by simulating the natural behavior of vehicles and maintain easy drivability. Moreover, fulfilling sustainable goals (environmental, social, techno-economical) was also a major part of this project. Ideas were strategized and sorted with time and a Gantt chart was generated.



TEAM IDENTITY

Logo Design: Our logo features a majestic tiger poised for action, exuding strength, agility, and confidence. Set against a backdrop of crimson red, with accents of black and orange, the tiger embodies the essence of our team - bold, fierce, and ready to dominate the competition. The sleek typography of "Crimson Gladiators" complements the imagery, projecting a sense of professionalism and sophistication.

Visual Elements: In addition to our logo, our branding incorporates dynamic visual elements such as sleek vehicle designs, captivating graphics, and vibrant imagery. Whether it's on the racetrack, in promotional materials, or on social media, our visuals command attention and leave a lasting impression, reflecting the high standards and innovative spirit of the Crimson Gladiators team.

Messaging and Tone: The Crimson Gladiators brand communicates with clarity, confidence, and a touch of audacity. Our messaging is bold, inspiring, and action-oriented, motivating others to join us on our journey of discovery and achievement. We speak with authority, authenticity, and passion, embodying the spirit of champions and trailblazers in the world of 4x4 engineering.

Our team identity development began with digital sketching of a range of logos based on our name: Crimson Gladiators – with a literal representation of a gladiator. Upon reviewing these, we change our design to incorporate a tiger which represents our values as a team as well as our university.

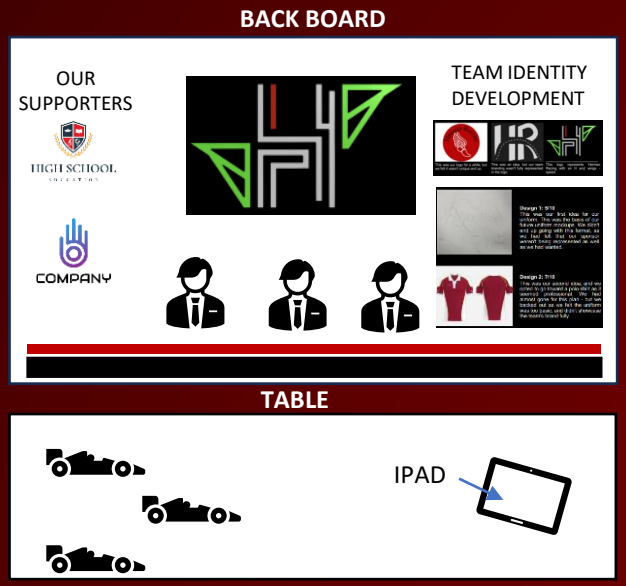
Pit Display

OBJECTIVES

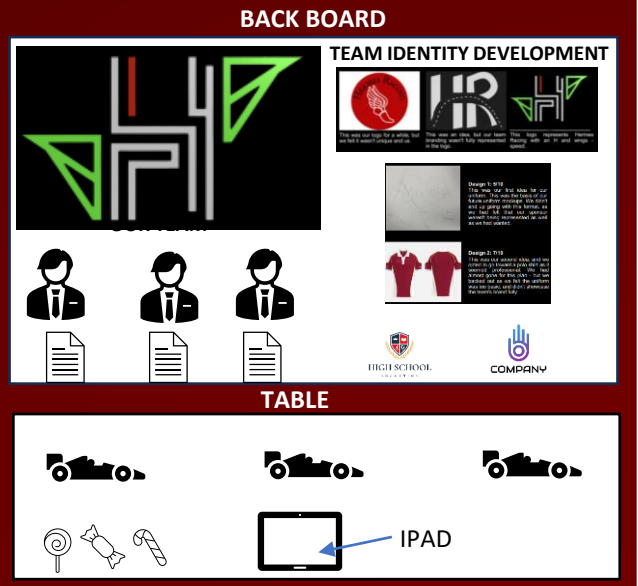
1. **Attract Attention:** Create a visually captivating display that draws spectators, judges, and other participants to our pit area.
2. **Showcase Team Identity:** Display our team name, logo, and colors prominently to reinforce our brand identity and create a memorable impression.
3. **Highlight Vehicle Features:** Showcase the key design elements, features, and innovations of our 4x4 vehicle through interactive displays, models, and demonstrations.
4. **Educate and Inform:** Provide information about our team, project, and the 4x4 in Schools competition to engage visitors and enhance their understanding of our work.
5. **Demonstrate Engineering Expertise:** Showcase our engineering skills, problem-solving abilities, and technical knowledge through engaging presentations and discussions.
6. **Interactive Engagement:** Offer hands-on activities, challenges, or simulations that allow visitors to experience the excitement of off-road engineering firsthand.
7. **Promote Sponsorship and Partnerships:** Highlight our sponsors and partners, showcasing their contributions and involvement in our project.
8. **Encourage Networking:** Create opportunities for networking, collaboration, and knowledge exchange with fellow teams, industry professionals, and enthusiasts.
9. **Inspire Future Engineers:** Inspire and motivate young visitors to pursue careers in STEM fields by showcasing the creativity, innovation, and teamwork involved in 4x4 engineering.
10. **Leave a Lasting Impression:** Ensure that visitors leave our pit display with a positive impression of our team, project, and the 4x4 in Schools competition, fostering goodwill and support for our endeavors.

IDEA 1

IDEA 2



IDEA 3



EVALUATION

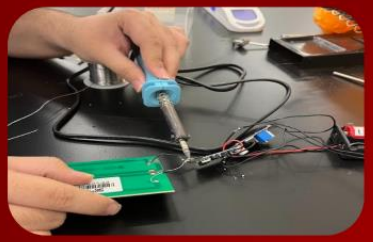
Overall, the pit display design shows promise but could benefit from refinements to maximize its impact and effectiveness during competitions. With some adjustments, it has the potential to effectively showcase the team's achievements and engage spectators more effectively.

RESEARCH

Solar Charging Battery

- Solar panel selection: We researched and identified the most efficient and compact solar panels that can be integrated into the RC car's design without compromising its performance.

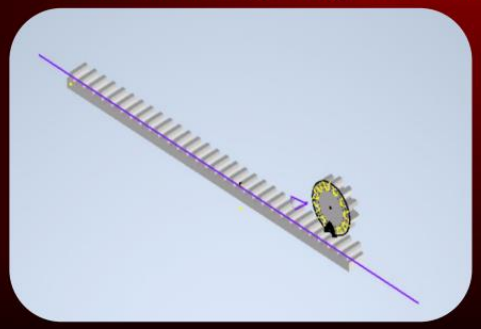
- Charging circuitry: We developed a robust charging system that efficiently converts solar energy into electrical power and charges the LiPo battery.

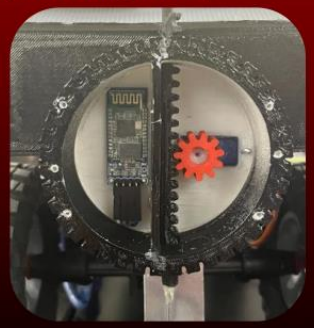


Tow bar Mechanism:

We examined and analyzed the performance of different gears in the rack and pinion configuration attached to a 9g Servo motor. We also examined various gear tooth profiles, such as involute or modified profile, to determine the most suitable profile for rack and pinion systems. We researched about gear module and tooth size selection to achieve the desired gear ratio while maintaining optimum flexural strength and contact area.

3D Models & Printing prototypes of gear and pinion configuration.



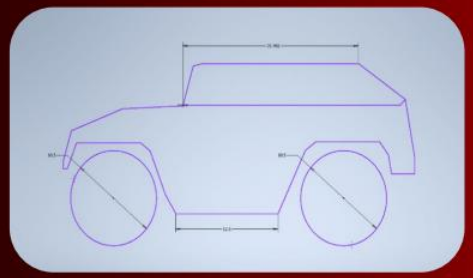


2D and 3D Sketches:

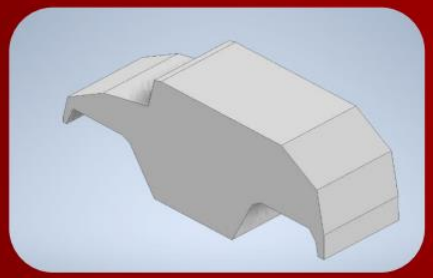
Drawings and models were prepared for the shell. These played a crucial role in visualizing and refining design concepts to ensure accurate dimension.
The tow bar mechanism was also re-imagined, incorporating a rack and pinion system. The tow bar, shaped like a spare rear tire, allowed seamless integration with the vehicle design while maintaining functionality.

While the team strived towards continuous improvement and refinement of the overall design, special consideration was given to optimize the designs for 3D printing. CAD models were prepared in Autodesk Inventor, sliced in Ultimaker Cura application, while the Wanhao Duplicator 9 3D printer meticulously manufactured the finalized designs.

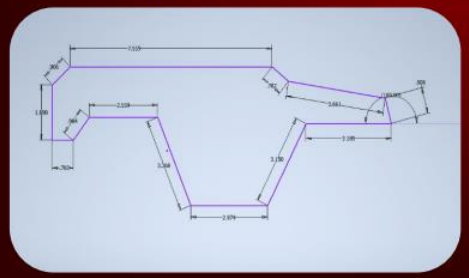
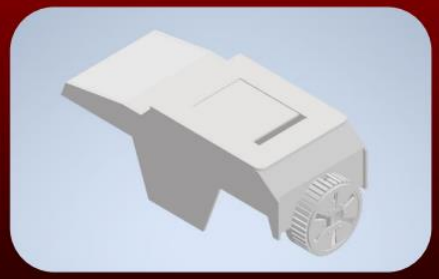
OLD 2D DESIGN



OLD 3D DESIGN



NEW 2D DESIGN



NEW 3D DESIGN