Team Vitesse

Project Management Portfolio

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Introduction

➢1.1 Overview

Team Vitesse is a passionate group of students competing in the F1 in Schools regional competition. Our goal is to design, manufacture, and race a miniature F1 car while demonstrating technical excellence, innovative problem-solving, and strong teamwork. Through structured project management, we aim to ensure efficient execution of all tasks, from design to competition day.

➢1.3 Team Mission & Vision

- **Mission:** To apply STEM knowledge in an innovative and collaborative environment to develop the best-performing F1 car.
- **Vision:** To inspire young engineers and business leaders by demonstrating excellence in engineering, marketing, and teamwork.
- **Core Values:** Innovation, Precision, Teamwork, Sustainability, and Continuous Improvement.
- **Long-Term Goal:** To advance to the national and international levels of the competition and establish a legacy for future teams at our school.

➢1.2 Project Objectives

- **Develop** an aerodynamically optimized F1 car using advanced engineering techniques.
- **Implement** cutting-edge manufacturing methods, including CNC machining and 3D printing.
- **Secure** sponsorships and funding to support project expenses.
- **Manage** time, resources, and risks to meet all deadlines.
- **Promote** team branding and engagement through strategic marketing campaigns.
- **Enhance** collaboration skills through teamwork and structured planning.
- **Maintain** sustainability by reducing material waste and using eco-friendly options where possible.
- **Ensure** regulatory compliance with F1 in Schools competition standards.

Project Timeline

➢2.1 Phases and Milestones

A structured timeline is essential to ensure timely progress and effective management of all aspects of a project. It allows for clear visibility into the workflow, helps to identify potential bottlenecks, and ensures that deadlines are met efficiently. By organizing tasks into a well-defined timeline, resources can be allocated more effectively, and teams can stay on track with their objectives. Below is a detailed breakdown of our project phases and key milestones:

1. Project Initiation Phase
Kick-off Meeting: Aligning the project team and stakeholders with the project's objectives and scope.
Defining Scope and Goals: Establishing clear project goals and deliverables.
Resource Allocation: Identifying and assigning the necessary resources, including personnel, budget, and tools.

2.Planning and Design Phase
Requirement Gathering: Collecting and analyzing all necessary project requirements.
Design and Architecture: Creating blueprints and designs that will guide the project development.
Risk Assessment: Evaluating potential risks and outlining mitigation strategies.

3.Execution Phase
Task Assignment: Distributing tasks among the project team based on expertise and capacity.
Development: Beginning the core work, whether it's design, construction, coding, or another primary activity.
Regular Status Updates: Monitoring and reporting on project progress to stakeholders and adjusting tasks if necessary.

4.Monitoring and Controlling Phase Performance Tracking: Continuously evaluating the project's progress against predefined milestones and timelines.
Quality Assurance: Ensuring that the project output meets the required standards and specifications.
Change Management: Adjusting project plans when unforeseen changes or challenges arise, ensuring the project remains on track.

5.Closing Phase
Final Deliverables: Ensuring that all tasks are completed and the final product meets the outlined objectives.
Client Review and Approval: Presenting the final product or result to stakeholders and obtaining feedback.
Post-Implementation Review: Conducting a review of the project to assess performance and identify areas for improvement in future projects.

Phase	Start Date	End Date	Key Milestones
Initiation	15/9/2024	27/12/2024	Team formation, brainstorming sessions
Planning	2/1/2025	28/1/2025	Concept design, sponsorship outreach
Execution	3/2/2025	5/3/2025	Car manufacturing, promotional campaign
Testing	-	-	Wind tunnel and track testing, refinements
Competition Prep	13/3/2025	17/4/2025	Presentation practice, final car tuning
Competition	19/4/2025	-	Regional event participation

Team Roles and Responsibility

➢3.1 Our Team

A strong and well-organized team structure is critical to the success of any project. It not only facilitates effective task allocation but also ensures that each member is accountable for their designated responsibilities. By assigning roles based on each individual's expertise, skills, and interests, we are able to leverage the unique strengths of our team members and ensure a smooth workflow throughout the project. Beside is an overview of the key roles within our project team and the associated responsibilities for each member. By defining these roles and assigning responsibilities based on the expertise of our team members, we create an environment where accountability and collaboration thrive. Each individual is empowered to take ownership of their tasks while contributing to the overall success of the project. This approach not only increases efficiency but also drives innovation as team members work closely together to achieve the project's objectives.

•**Suraj Gupta**: Oversees the Design Engineering portfolio and plays an integral role in the car's design development and leads the project.
•**Lakshya Aggarwal**: Leads the design process of our car, responsible for shaping the overall design vision and assists in sponsorships.
•**Aarav Sareen**: Manages the team's finances and oversees the enterprise portfolio, ensuring financial sustainability and resource allocation.
•**Ryaan Verma**: Heads the project management portfolio as the Project Manager, overseeing progress, timelines, and coordination across teams.
•**Ayan Sur**: Handles sponsorships, responsible for building and maintaining partnerships to support the project's financial and resource needs.

➢3.2 Communication Plan

To ensure seamless collaboration, the team follows these communication strategies:

- Weekly team meetings for progress updates and problem-solving.
- Online task management using Trello and Slack for task tracking and deadline reminders.
- Regular check-ins with mentors and sponsors for expert guidance.
- Documentation of key decisions and challenges in a shared project management platform.

Budget & Resource Management

➢4.1 Budget Breakdown

Careful financial planning is absolutely essential to effectively managing project expenses and ensuring the successful completion of the project within budget. A well-structured financial plan provides a clear outline of anticipated costs, helping to allocate resources efficiently and avoid unexpected financial challenges. It involves estimating costs for all aspects of the project, including materials, labor, technology, marketing, and overheads.

Throughout the project, both **estimated** and **actual costs** are closely monitored and compared. This ongoing assessment allows the team to identify any discrepancies between the projected and actual expenditures early on. By keeping track of spending, project managers can make informed decisions to adjust budgets, reallocate resources, or make cost-saving adjustments to avoid overspending.

Regular financial reviews also play a critical role in identifying potential financial risks, such as unforeseen costs or scope creep, and in taking proactive steps to mitigate these risks. This monitoring process ensures that the project stays financially sustainable and is completed without compromising quality or objectives. Additionally, by continuously evaluating and adjusting the budget as necessary, the team can ensure that funds are used in the most efficient way, helping to maximize the overall impact of the project while maintaining financial discipline.

Ultimately, effective financial planning and oversight create a solid foundation for the project's success, ensuring that it is completed on time, within scope, and within budget.

Item	Estimated Cost	Actual Cost	Notes
Materials	₹5,000	₹3,000	Carbon fiber, wheels, axles, paints, adhesives
Manufacturing	₹9,000	₹7,000	CNC machining, 3D printing, laser cutting
Marketing	₹1,000	₹2,000	Posters, social media ads, merchandise
Travel & Fees	₹40,000	₹32,000	Transportation, registration, accommodation
Miscellaneous	₹1,000	₹2,000	Unexpected costs, backup materials

➢4.2 Sponsorship & Fundraising

- **Corporate Sponsorships:** Engaged with local businesses, engineering firms, and car manufacturers.
- **Crowdfunding Campaign:** Raised awareness through social media and community platforms.
- **School & Community Support:** Collaborated with educational institutions and local STEM programs.
- **In-Kind Donations:** Secured material and manufacturing support from industry professionals.

Risk Assessment and Mitigation Strategies

➢5.1 Strategies of Risks

Effectively managing risks is essential to the success of the project. Potential risks such as manufacturing delays, budget overruns, technical failures, and sponsor withdrawals could all significantly impact progress. To mitigate these risks, the team employs a structured, proactive approach to problem-solving and contingency planning.

Manufacturing delays pose a major risk, as delays in production can affect testing and final adjustments. To prevent this, the team prioritizes early prototyping and ensures robust relationships with material suppliers. Additionally, they maintain a stockpile of backup materials and have alternative production methods on standby, ensuring the project can continue smoothly even in the event of unforeseen setbacks.

Budget management is another critical area of focus. Financial oversight is maintained through meticulous expense tracking and regular budget reviews. To protect against potential shortfalls, the team diversifies funding sources, including corporate sponsorships, school contributions, and crowdfunding initiatives. Consistent sponsor engagement, including regular progress updates and professional presentations, helps solidify sponsor relationships and minimize the risk of funding withdrawals.

Technical challenges, such as design inefficiencies or structural weaknesses, are addressed through rigorous testing and iteration. The team conducts multiple rounds of CFD simulations and wind tunnel testing to refine the car's aerodynamic performance. A contingency plan is also in place to ensure that, should a design or technical issue arise, alternative solutions can be implemented quickly and without disrupting the project timeline.

By addressing these risks proactively and maintaining a flexible, solution-oriented approach, the team ensures that potential challenges are managed effectively, allowing the project to stay on course and meet its objectives.

Risk	Impact	Mitigation Strategy
Manufacturing delays	High	Early production, supplier backup plan.
Budget overruns	Medium	Close financial tracking, additional sponsorships.
Technical failures	High	Backup prototypes, rigorous testing and data validation.
Team coordination issues	Medium	Weekly progress meetings, defined roles and responsibilities.
Sponsor withdrawals	Medium	Diversify funding sources, maintain strong communication with sponsors.
Regulatory compliance issues	High	Strict adherence to F1 in Schools rulebook, regular review.
Branding issues	Medium	Consistent team messaging, quality control over marketing materials.

Car Design and Engineering

➢6.1 Design Process

•**Concept Development:** The team generates design ideas based on core F1 aerodynamics principles, focusing on optimizing downforce, reducing drag, and ensuring high-speed stability. This stage involves researching current F1 designs and aerodynamics theory to guide the design direction.

•**CAD Modeling:** Detailed 3D models of the car are created using Fusion 360, which allows for precise design and simulation. The software helps refine the car's geometry, assess fitment of components, and predict performance, ensuring no issues before physical production.

•**Computational Fluid Dynamics (CFD) Testing:** CFD simulations are conducted to analyze airflow over the car's surface. The results help identify areas for improvement by reducing drag and optimizing aerodynamic flow, ensuring the car's design is both efficient and fast.

•**Design Iteration:** Based on feedback from wind tunnel tests, the design undergoes continuous iteration to refine aerodynamic efficiency. This allows the team to make adjustments for better performance, ensuring the car is optimized for real-world conditions.

•**Weight Optimization:** The team works to minimize the car's weight while ensuring it complies with F1 in Schools regulations. Lightweight materials and strategic design choices are made to maximize speed and acceleration without compromising safety or structural integrity.

•**Sustainable Material Choices:** The team evaluates environmentally friendly materials that offer performance similar to traditional options but with less environmental impact. This ensures the car is not only high-performing but also aligns with sustainable engineering practices.

➢6.2 Manufacturing Process

•**CNC Machining for High-Precision Parts:** CNC machining is used for precise fabrication of key components like the chassis.

•**3D Printing for Rapid Prototyping:** 3D printing allows quick prototyping and testing of parts before final production.

•**Hand-Finishing for Precision Detailing:** Hand-finishing ensures smooth surfaces and high-quality details on the parts.

•**Assembly and Final Quality Assurance Checks:** The car is assembled and undergoes final quality checks to ensure everything meets standards.

•**Use of Recyclable Materials for Non-Essential Components:** Recyclable materials are used for non-critical parts to minimize waste.

Performance Tracking & KPIs

➢7.1 Key Performance Indicators

1. Meeting All Project Deadlines

•Ensure all project phases (design, prototype, testing, marketing, etc.) are completed on schedule.

•Monitor project progress regularly to identify potential delays early on and take corrective actions.

•Maintain effective communication between team members to keep everyone aligned with deadlines.

2. Keeping Expenses Within 10% of Initial Budget

•Track and analyze expenses on a weekly or monthly basis to prevent budget overruns.

•Identify areas where costs can be reduced without compromising quality (e.g., materials, labor, logistics).

•Negotiate with suppliers and vendors to secure better deals and discounts.

3. Achieving Optimal Car Weight and Speed

•Continuously refine the car's design and materials to reduce weight without sacrificing structural integrity.

•Conduct extensive testing and simulations to optimize aerodynamics and ensure maximum speed potential.

•Balance weight reduction with performance metrics to ensure the car remains stable and efficient at high speeds.

4. Increasing Sponsorship Funding by At Least 20%

•Develop a compelling sponsorship package that highlights the benefits of partnering with the project (e.g., brand visibility, market reach).

•Engage with potential sponsors through targeted outreach campaigns, including emails, meetings, and presentations.

•Foster relationships with current sponsors by demonstrating the positive impact of their support and offering them increased visibility.

•Explore new avenues for sponsorship (e.g., digital media, influencer partnerships) to diversify funding sources.

5. Achieving a Race Time Under 1.5 Seconds in Testing

•Conduct thorough testing in various conditions to identify potential improvements to the car's performance.

•Focus on fine-tuning both mechanical and aerodynamic elements to optimize the car's speed and efficiency.

•Utilize data from simulations and real-world testing to adjust and refine critical systems, such as the drivetrain, suspension, and braking.

•Set incremental milestones to continuously improve the race time leading up to the competition.

6. Measuring Improvements in Aerodynamics via CFD (Computational Fluid Dynamics) Results

•Use CFD software to simulate airflow over the car's body and identify areas where drag can be reduced and downforce can be optimized.

•Compare CFD results over multiple iterations of the car's design to gauge improvements and ensure better overall performance.

•Collaborate with aerodynamic specialists to interpret CFD results and make data-driven decisions to enhance the car's design.

•Perform wind tunnel testing to validate CFD predictions and fine-tune the car's aerodynamics before the final build.

Marketing and Branding

➢8.1 Team Identity

•Custom Team Logo, Uniform, and Color Scheme

•Design a unique, professional logo that reflects the team's identity, values, and goals, ensuring it's memorable and adaptable across various platforms.

•Create matching uniforms for the team that incorporate the logo and color scheme, ensuring the team looks cohesive and professional in all appearances.

•Choose a consistent color palette that aligns with the team's vision, using it across all materials, including uniforms, merchandise, and digital platforms to create a strong, recognizable brand.

•Official Website and Active Social Media Presence

•Develop a clean, user-friendly website that includes essential sections like "About the Team," "Sponsors," "News," and "Contact," with regular updates on the team's progress.

•Maintain active, engaging social media profiles on platforms like Instagram and YouTube, where followers can get real-time updates, exclusive content, and a closer look at the team's activities.

•Regularly post a mix of content, including behind-the-scenes footage, team achievements, and progress updates, to keep the audience engaged and informed.

•Merchandise (Stickers, Keychains) to Engage Supporters

•Offer a range of branded merchandise like stickers, keychains, and apparel that prominently feature the team's logo and colors, giving supporters a way to show their involvement.

•Sell these items through the website and social media platforms, allowing fans to support the team while also helping to spread the word.

•Introduce limited-edition items at special moments, such as major milestones or events, to build excitement and create a sense of exclusivity.

•Promotional Video Highlighting the Team's Journey

•Create an engaging, short video that highlights the team's progress, key milestones, and the journey from concept to competition, showing the dedication and hard work behind the scenes.

•Include behind-the-scenes footage, interviews with team members, and key moments from the project's development to build a personal connection with the audience.

•Share the video across the website, social media channels, and at events to increase visibility, attract more supporters, and generate excitement.

Lessons Learned & Future Plans

➢9.1 Key Takeaways

•The Importance of Clear Planning and Time Management:
Throughout the project, we learned that clear, structured planning is the cornerstone of success. Breaking down tasks into smaller, achievable milestones helped the team stay on track and meet deadlines. Time management became critical, especially as the project grew in complexity, ensuring that we allocated enough time to each phase without compromising quality. Setting realistic deadlines and sticking to them, while also adjusting when needed, ensured the project stayed on schedule despite any hurdles. We learned the significance of revisiting the plan regularly to ensure it still aligned with the project's goals and timelines.

•Learning Advanced Engineering and Business Skills:
This project provided hands-on experience in both engineering and business disciplines. On the engineering side, we deepened our understanding of advanced design principles, aerodynamics, material science, and testing methods. These technical skills were crucial in improving the car's performance and meeting design goals. On the business side, we enhanced our abilities in project management, budgeting, sponsorship acquisition, and marketing strategies. We gained insights into the importance of balancing technical development with strategic business decisions, ensuring that engineering advancements were complemented by solid financial and branding strategies. This combination of engineering and business knowledge will be invaluable as we continue to pursue more complex projects.

•Overcoming Unexpected Challenges Through Teamwork:
No project is without its challenges, and this one was no exception. From design flaws to unexpected delays, we encountered numerous obstacles. However, we learned that teamwork was essential to overcoming these hurdles. When problems arose, the team quickly adapted and worked collaboratively to brainstorm solutions, making the best use of everyone's strengths and expertise. This collaborative spirit not only helped solve technical issues but also fostered a sense of camaraderie and shared responsibility, motivating the team to stay committed. We learned that being adaptable and maintaining strong communication within the team are crucial to navigating the unpredictability that often comes with complex projects.

•Enhancing Project Adaptability Through Proactive Risk Management:
One of the most valuable lessons we learned was the importance of risk management. By identifying potential risks early in the project, we were able to develop proactive strategies to mitigate those risks. Whether it was budget overruns, supply chain issues, or technical challenges, having contingency plans in place helped us pivot quickly when things didn't go as expected. Risk management wasn't just about avoiding problems—it was about being flexible and maintaining focus on long-term goals even when faced with setbacks. This approach not only saved valuable time and resources but also made the team more resilient and confident in facing the unexpected.

Competition Readiness

➢10.1 Final Review

As the competition approaches, Team Vitesse ensures all aspects of the project are completed and thoroughly reviewed. This final review phase includes:

1. Car Testing & Optimization:

•Conduct final wind tunnel testing, adjust weight distribution, and run race simulations to ensure the car is performing at its best before the event.

2. Presentation Rehearsals:

•Practice team presentations to ensure clarity and confidence, ensuring each member is prepared to answer questions and explain their project effectively.

3. Pit Display Assembly:

•Verify that all pit display components are ready, including banners, printed materials, and interactive elements, ensuring a professional and engaging display at the event.

4. Technical Documentation Check:

•Review engineering reports, CAD drawings, and design portfolios to ensure all documents meet F1 in Schools regulations and are ready for submission.

5. Sponsor & Media Engagement:

•Provide final updates to sponsors and engage with media to maximize visibility and exposure in the lead-up to the competition.

6. Logistics & Travel Arrangements:

•Double-check that all materials, tools, and equipment are packed and ready, and finalize travel arrangements for the team to ensure everything runs smoothly on competition day.

By following this structured approach, Team Vitesse ensures a smooth and successful experience at the regional event, positioning itself as a strong contender for further stages of the F1 in Schools competition.