BHARATH CYCLE DESIGN CHALLANGE

conducted by

ALL INDIA COUNCIL OF TECHNICAL EDUCATION

in partial fulfilment for the award of the degree

of

BACHELOR OF TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION

KRISHNANKOIL 626 126

2023-24

KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION

KRISHNANKOIL 626 126

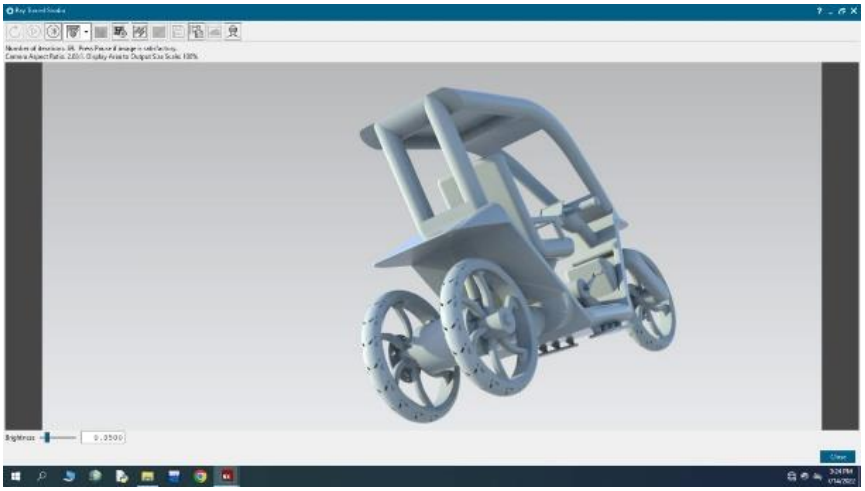
TABLE OF CONTENTS

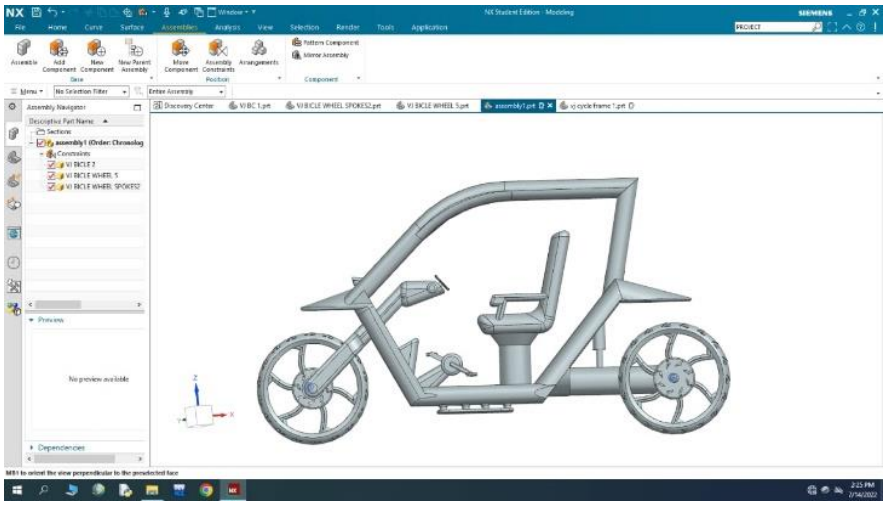
STAGE 1 (DESIGNING):

We actively participated in the Bharat Cycle Design Challenge, organized by the All India Council for Technical Education. The competition comprised three stages, beginning with the creation of a CAD model for a bicycle. Our team focused on designing a bicycle tailored for the commuter EV category, addressing the needs of daily cyclists. We integrated valuable feedback from our professor and insights gathered from a survey of frequent bicycle users. After refining our design based on this input, we completed the final model and successfully submitted it to the BCDC portal. This experience not only enhanced our design skills but also provided practical insights into user-centric design and engineering.

CAD MODEL:

We designed this cad model of bicycle in NX CAD and this is our out come of the design





STAGE ONE RESULT:

We were thrilled to learn that our design was selected at the national level, advancing us to the next stage of the competition. Additionally, our bicycle design secured first place in the commuter EV category. This achievement was a significant milestone for our team and affirmed the effectiveness of our design and approach.

Moreover, we were awarded a grant of rupees 40,000 for prototyping, which significantly boosted our ability to bring our design to life. This funding allowed us to enhance the precision and quality of our work, enabling us to experiment with advanced materials and innovative technologies. With this support, we were able to refine our design, optimize its performance, and push the boundaries of what we could achieve. This pivotal moment marked the beginning of an exciting phase in our project, as we transitioned from concept to reality with renewed confidence and determination.

Phone : 011-26131577 - 78, 80
011-29581000
Website : www.aicte-india.org

सत्यमेव जयते

अखिल भारतीय तकनीकी शिक्षा परिषद्
(भारत सरकार का एक सांविधिक निकाय)
(मानव संसाधन विकास मंत्रालय, भारत सरकार)
नेल्सन मंडेला मार्ग, वसंत कुंज, नई दिल्ली-110070

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION
(A Statutory Body of the Govt. of India)
(Ministry of Human Resource Development, Govt. of India)
Nelson Mandela Marg, Vasant Kunj, New Delhi-110070

AICTE/T&LB/ATAL/BCDC/2023 **Dated:11.08.2023**

Circular

Sub:- Bharath Cycle Design Challenge(BCDC) – shortlisted designs for prototyping-reg.

Bharath Cycle Design Challenge(BCDC) is an initiative of All India Council for Technical Education (AICTE) in association with Namma Nimma Cycle Foundation, Bengaluru to encourage innovation and creativity in design and making of electric and non-electric bicycles- in categories of cargo and commute. The competition called for 2D & 3D designs from group of students of technical institutions to identify 04 designs each under cargo EV, cargo Non-EV, Commute EV and commute Non-EV categories for development of prototypes.

Based on recommendations of the evaluation committee and with the approval of Competent Authority the teams shortlisted under each category for prototype development is listed: -

Category	S.No	Name of Team Leader	Dept./College/Address
Cargo EV	1	Sahaj Navinbhai Patel	Mechanical Engineering, Government Engineering College, PO Katpur, Patan-384265
	2	Nadhapriyan. M.S	Electronics and Communication Engineering, Rajalakshmi Institute of Technology, Kuthambakkam Post, Poonamallee, Chennai-600124
	3	Nilan Sujai A	Mechanical Engineering, Hindusthan College of Engineering and Technology, Pollachi Main Rd, Coimbatore, Malumichampatti-641032
	4	Nagulraj V	Mechanical Engineering, Kongu Engineering College, Erode, Perundurai-638053
Cargo Non-EV	1	Vivek	Mechanical Engineering, J C Bose University of Science and Technology (YMCA), Mathura Rd, Sector 6, Faridabad, Gurgaon-122001
	2	Gunalan P A	Mechanical Engineering, Kongu Engineering College, Thoppupalayam, Kumaran Nagar, Perundurai, Tamil Nadu,Erode-638060
	3	Shravan Venugopal Shetty	Electronics and Computer Science Engineering, Pillai College of Engineering, Dr. K. M. Vasudevan Pillai Campus, Plot No. 10, Sector 16, New Panvel East, Navi Mumbai-410206
	4	Anirudh CR	Mechanical Engineering, Cochin University of Science and Technology, Pipeline Rd, Kalamassery, Kerala, Ernakulam-682038

11.08.2023

सूचना का अधिकार

Commute EV	1	R. Vishwajeet	Mechanical Engineering, Kalasalingam Academy of Research & Education (KARE), Anand Nagar. Krishnankoil, Virudhunagar-626126
	2	Kathiravan M	Mechanical Engineering, Thiagarajar College of Engineering, TCE Road, Thiruparankundram, Madura-625015
	3	Kedar Mukesh Adhatrao	Mechanical Engineering, Walchand Institute of Technology, Solapur-413004
	4	Akhil Kumar S T	Electrical & Electronics Engineering, Kalaignar Karunanidhi Institute of Technology, Kannampalayam, Coimbatore-641402
Commute Non-EV	1	Dhanush Kumar S B	Mechanical Engineering, St. Joseph's College of Engineering, OMR,Chennai-600119
	2	Pramoda	Mechanical Engineering, Maharaja Institute of Technology, Thandavapura, Mysuru - Ooty Road, Nanjanagudu, Taluk, Karnataka, Mysore -571302
	3	Stephen Jebaraj.M	Mechanical Engineering, National Engineering College, Kovilpatti-628503
	4	Aarya Bhatia	Mechanical Engineering, SVKM's NMIMS MPSTME, Bhaktivedanta, Swami Vivekananda Rd, near Cooper Hospital, Navpada, JVPD Scheme, Vile Parle West, Mumbai, Maharashtra 400056

The teams are required to develop prototype at your institute or any AICTE Idea lab nearby. The physical model be developed such that the evaluation team could complete assessment on or before 15.09.2023. Email communication to team leaders of each group have been sent along with list of IDEA labs and bank mandate form for providing seed money for prototype development.

Congratulations and all the best wishes!!

Yours Sincerely,

11.08

Dr. Sunil Luthra,
Director, T&L Bureau

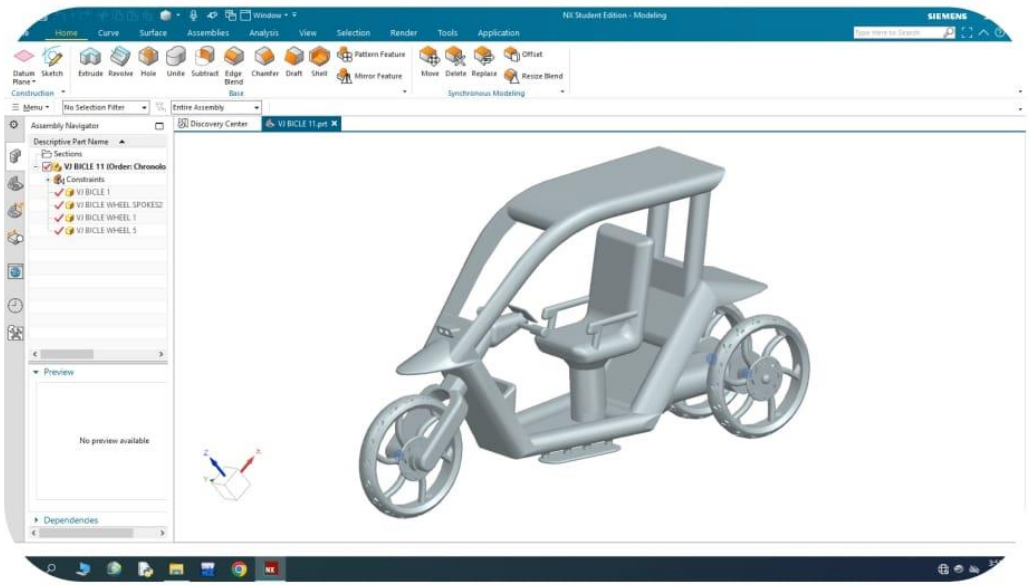
STAGE TWO (PROTOTYPING)

We began working on the prototype, which involved sourcing and arranging the necessary materials. To ensure the highest quality, we conducted thorough research and went in search of the specific components required to build the bicycle. This process included evaluating different suppliers, comparing material properties, and negotiating for the best possible prices. We also took into consideration the environmental impact of our choices, opting for sustainable materials wherever possible. This phase was crucial in laying the foundation for a durable and efficient prototype, as it allowed us to meticulously plan and assemble each part of the bicycle with precision and care.

IMAGES OF PROTOTYPING STAGE:


SOLANCE

CAD MODEL



PROTOTYPE

PRODUCT VISION:

Project Report: Weather-Protected Bicycle Design

1. Designing: Our design process was driven by a commitment to accessibility and innovation. Utilizing Siemens NX CAD software, we meticulously crafted a vehicle that caters to the needs of physically disabled individuals. The software enabled us to create a highly detailed and accurate model, ensuring that every aspect of the design is optimized for ease of use. The vehicle's design prioritizes user-friendly features, allowing physically disabled users to handle it with ease, thereby enhancing their independence and mobility.

2. Product Vision: We recognized the significant challenges that people face when cycling in harsh weather conditions. Our vision is to bridge the social gap by developing a weather-protected bicycle that offers the comfort and protection of a car. This design aims to provide an affordable and practical alternative for those who do not own a car, ensuring that they can commute comfortably regardless of the weather. Our goal is to make cycling a more viable and appealing option for everyone, especially in regions with challenging climates.

3. Testing: To further enhance accessibility, we integrated a rolling chair within the bicycle design. This innovative feature allows for an effortless transition between cycling and seated mobility, ensuring that riders can easily switch to a comfortable seated position when needed. The rolling chair is designed to be user-friendly, providing both convenience and versatility. This addition is particularly beneficial for users who may require frequent rest or for those who need to switch between different modes of mobility throughout their journey.

4. Ergonomics and Dynamics: Our design emphasizes comfort, ease of use, and safety. Key ergonomic and dynamic features include:

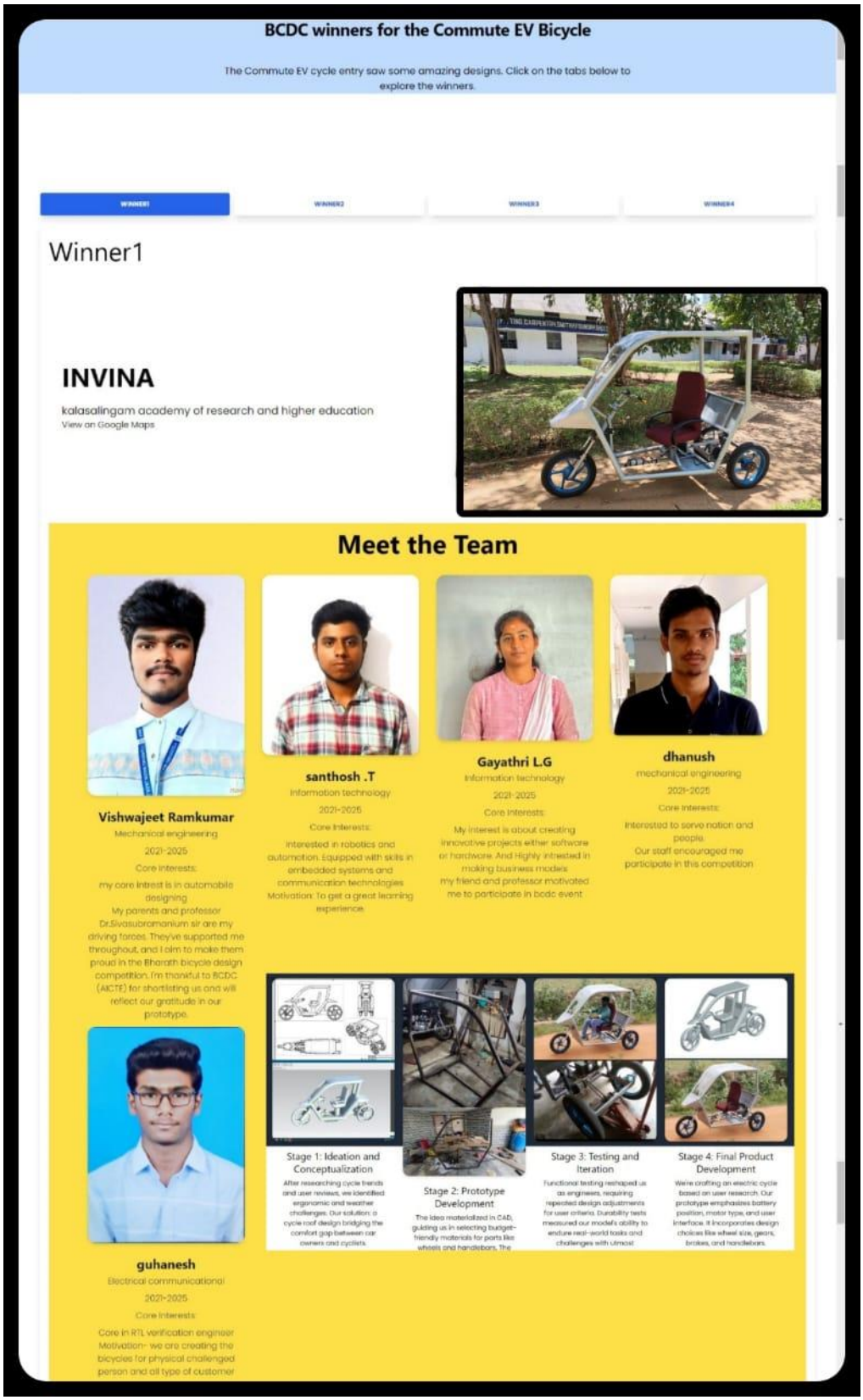
    - Comfortable Driving Position: The bicycle is designed with a comfortable driving position, reducing strain on the rider and allowing for longer rides with minimal fatigue.

    - Easy Maneuverability: The vehicle is engineered for easy maneuverability, ensuring that it can be handled smoothly in various environments, from crowded urban streets to more challenging terrains.

    - Easy Access to the Vehicle: Accessibility is a core aspect of our design. The bicycle is built to allow easy access, making it simple for users to get on and off, even for those with limited mobility.

FINAL PRODUCT:

WINNERS OF COMMUTE EV CATEGARY:



TEAM POSTER:


PRODUCT VISION
we were able to see the difficulties faced by people during harsh weather conditions ranging from heavy rain to scorching heat that were undergone by citizens of natural needs on riding a bicycle.This made us realise the social gap's affection on the day to day life chores for travel. Thereby we want to design a roof over the head cycle evolving our prototype to an all new level answering the never asked question of reserved comfort of people who have cars and the others who don't.
COLLEGE NAME
KALASALINGAM UNIVERSITY
CONTACT INFO
9921009035@klu.ac.in
8608055806
Vishwajeet .R
Santhosh.T
Gayathri. L
Dhanush
Guhanesh
HOW WE MADE IT HAPPEN ?
Our idea blossomed in CAD with a detailed 3D model. Budget-friendly materials were chosen for vital components like wheels and brakes. The framework united everything seamlessly. The manufacturing phase, marked by welding sparks, highlighted our dedication and passion, evident in our enthusiastic eyes.
STEP 1
We made a suitable bicycle frame, considering weight and structural integrity.
STEP 2
Assembling electric components like Mounting a battery, connecting it to the motor via a controller and attach a throttle.
STEP 3
Test the prototype's functionality, gather feedback, and refine design accordingly.
PRODUCT
INVINA
PRODUCT MAKING

GRANG FINALE PARTICIPATION:

OUT COME:

Outcome and Lessons Learned from the Bharat Cycle Design Challenge

Participating in the Bharat Cycle Design Challenge was an enriching experience that offered valuable lessons and outcomes for our team. Here are the key takeaways:

1. **Enhanced Design and Engineering Skills:**

    - The challenge provided us with an opportunity to apply our theoretical knowledge to a real-world project. By utilizing Siemens NX CAD software, we gained hands-on experience in creating complex and user-centric designs. This experience significantly improved our design and engineering skills, particularly in areas such as ergonomics, dynamics, and accessibility.

2. **Importance of User-Centric Design:**

    - The insights we gathered from surveys of frequent bicycle users were crucial in refining our design. This experience reinforced the importance of understanding and addressing the needs of the end-users in any design process. By focusing on user feedback, we were able to create a product that not only meets but exceeds the expectations of our target audience.

3. **Collaboration and Teamwork:**

    - The competition emphasized the value of collaboration and teamwork. Working closely with our professor and within our team, we learned how to effectively communicate ideas, integrate feedback, and work towards a common goal. This collaborative approach was instrumental in the success of our project.

4. **Prototyping and Material Selection:**

    - The prototyping phase taught us the significance of thorough research and careful material selection. We learned how to evaluate suppliers, compare material properties, and consider the environmental impact of our choices. This experience provided us with a deeper understanding of the importance of sustainability and quality in product development.

5. **Innovation and Problem-Solving:**

    - The competition challenged us to think creatively and innovate, particularly in designing a weather-protected bicycle that could bridge social gaps. By integrating features such as a rolling chair for enhanced accessibility, we were able to address multiple challenges and create a versatile product. This experience honed our problem-solving skills and encouraged us to push the boundaries of conventional design.

6. **Project Management and Execution:**

    - Managing the various stages of the project, from design to prototyping, required effective project management skills. We learned how to plan, execute, and monitor progress to ensure that our project stayed on track. This experience also highlighted the importance of flexibility and adaptability in overcoming unexpected challenges.

7. **Recognition and Motivation:**

    - Securing first place in the commuter EV category and receiving a grant for prototyping were significant milestones that validated our efforts and approach. This recognition not only boosted our confidence but also motivated us to continue pursuing innovative projects with the same level of dedication and passion.

8. **Impact of Practical Experience:**

    - The competition provided us with practical insights that complemented our academic learning. It underscored the importance of balancing theoretical knowledge with hands-on experience, a combination that is essential for success in any engineering and design field.

Overall, the Bharat Cycle Design Challenge was a transformative experience that equipped us with the skills, knowledge, and confidence to tackle future projects. It also reinforced our commitment to creating innovative, user-friendly, and sustainable designs that make a positive impact on society.