MANJARA CHARITABLE TRUST

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

RGIT's ROBOTICS CLUB

REPORT OF ACADEMIC YEAR 2023-24

Established in July 2018, RGIT's Robotics Club is the very first official Robotics committee of the institute. We abide by the mission to acquaint students of our institute with the currenttrends of Robotics and Automation in the Industries by providing sufficient practical exposure and opportunities, which will enhance their knowledge along with developing technical as well as soft skills thus in creating skilled individuals for the betterment of the society and country.

Today, Robotics is a rapidly growing field, as we continue to research, design and build new robots that serve various practical purposes including domestic, commercial and military. The RGIT Robotics Club strives to stimulate interest in robotics among the students of the institute. Besides making a serious endeavour to spread knowledge on Robotics and its diverse applications, it also stands by the subtle acronym of TEAM - 'Together Everyone Accomplishes More'. Well defined goals, an organized and disciplined work structure and motivated members are the features of the club.

Website: www.rgitsroboticsclub.com

Email ID: rgitsroboticsclub@gmail.com

Conveners: Dr. A.V. Gotmare

Program Outcomes (PO) Engineering Graduates will be able to:

PO1 **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6 **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12 **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

MANJARA CHARITABLE TRUST

RAJIV GANDHI INSTITUTE OF TECHNOLOGY, MUMBAI

(Permanently Affiliated to University of Mumbai)

Department of Mechanical Engineering

Vision

To create competent technical professionals in Mechanical Engineering with ethical behaviour and environment consciousness.

Mission

1. To provide contemporary and cutting-edge technical education in Mechanical Engineering.
2. To provide an ambience which nurtures research ideas in futuristic domains of Mechanical Engineering.
3. To initiate project based learning and practical exposures in the area of Mechanical Engineering.
4. To direct faculties in research and consultancy / advisory roles.
5. To establish strong linkages with well-known national and international technical institutes.
6. To promote the culture of imbibing environmental care and eco-friendly designs.
7. To become a department of aspiration & choice.

Program Educational Objectives (PEOs)

PEO1: To prepare the stakeholder to exhibit leadership qualities with demonstrable attributes in lifelong learning to contribute to the societal needs.
PEO2: To make ready the stakeholder to pursue higher education for professional development.
PEO3: To help the stakeholder to acquire the analytical and technical skills, knowledge, analytical ability attitude and behavior through the program.
PEO4: To prepare the stakeholders with a sound foundation in the mathematical, scientific and engineering fundamentals.
PEO5: To motivate the learner in the art of self-learning and to use modern tools for solving real life problems and also inculcate a professional and ethical attitude and good leadership qualities.
PEO6: To prepare the stake holder to able to Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Program Specific Outcomes (PSOs)

PSO1:Successful Career and Entrepreneurship: Graduates will be able to understand the social-awareness and environmental wisdom along with ethical responsibility to have a successful career and to sustain passion and zeal for real-world applications using optimal resources as an entrepreneur.
PSO2: Hobbies and Career: Graduates have nurtured their hobbies which are useful in their specific chosen career.

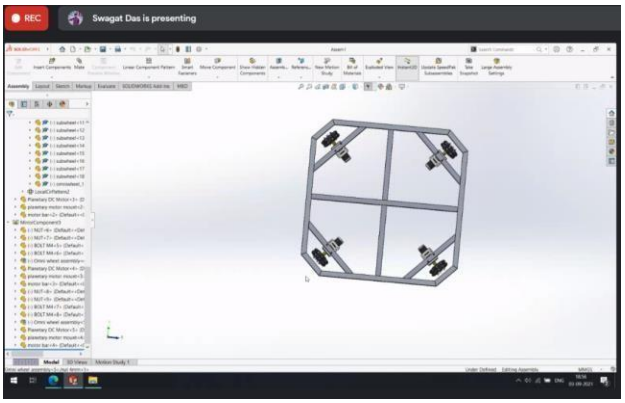
Sr. No	Activity	Type of Activity	Duration	Remarks
1.	DD ROBOCON 2023	Competition	July 2023-ongoing	Completed
2.	Inauguration of E-yantra Lab	Seminar	5th September 2023	Completed
3.	FE Orientation (KYD)	Seminar	10th August 2023	Completed
4.	Line Follower Robot Competition in SFIT	Competition	July 2023-September 2023	Completed
5.	Training sessions for the members of club	Workshop	September 2023	Completed
6.	DD Robocon 2023 stage 1	Competition	31st January 2024	Completed

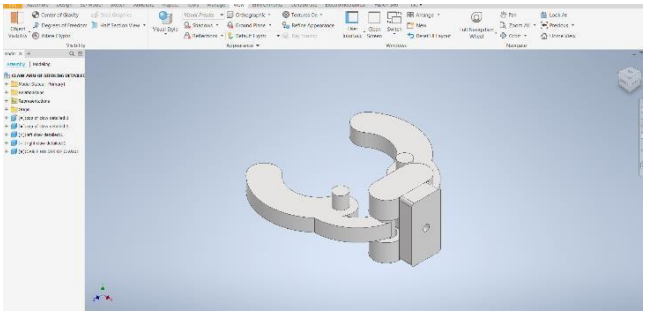
1. DD ROBOCON 2023

Every Year RGIT's Robotics Club aims and participates in the Asia Wide Pacific ABU Robocon. In this Competition, A task is provided which is to be completed by a pair of Robots. Robots are solely made on the knowledge and Work of Students of the specific team. In General, the whole team of RRC participates in this International Event. There are Departments which consists of Mechanical Design, Electronics, Programming, Marketing. There are stages where the team must qualify to get eligible for next stage. In this Competition, there are three stages where stage 1 requires Detailed Design report, Second Stage requires the manufactured Robot in a working stage, In third stage the participants competes other teams in an arena.

Current Interested Participants:

1. Rishab Maurya (President of RRC)
2. Ayush Somaiya (Vice-President of RRC)
3. Rutika Awale (Electronics Head of RRC)
4. Yash gala (Programming Head)
5. Prachi Chaure (Jt. Marketing Head)
6. Snehal Warkhede (Jt. Marketing Head)
7. Sunny Raiba (RRC team member)
8. Pravin Ingale (RRC team member)
9. Gauresh Pathak (RRC team member)
10. Vipul Solanki (RRC Team member)
11. Akshay Kantharia (RRC team member)





The first session was conducted by Rishab Maurya where he gave a brief about Robocon and how to proceed with preparations of robot further mentioning the planning and team building in Robotics. The second session was conducted by Yash Gala accompanied by Ayush Somaiya. They explained the participants basics of mechanisms which we are using in competition. Participants were also shown some previously designed robot parts which the team had made.

2. Inauguration of E-Yantra Lab in RGIT

RGIT's Robotics Club coordinated with RGIT for the setup and preparation of a new lab in RGIT basement. The Inauguration Program was Executed on 5th September 2023. All of the Professors were present with our HOD and Principal Sir. IIT Bombay and different college professors with E-yantra Coordinators were present in a conference call.

After the conference call our honorable principal sir visited the lab and completed the ribbon ceremony for E-Yantra Lab and a brief discussion of Robots Functions were discussed and demonstration of robots were completed by RRC.

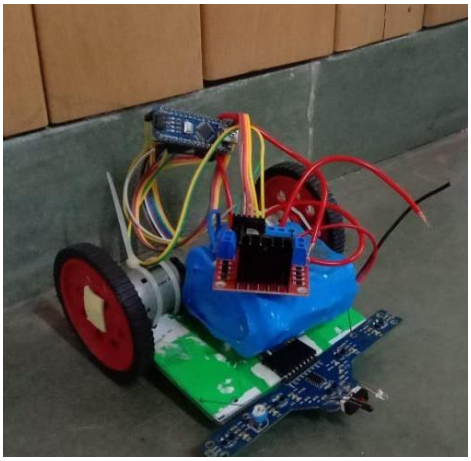
3. F.E ORIENTATION (KYD) 2023-24

On 10th August 2023 RRC demonstrated All about Robotics in F.E Orientation Program. The Speech of how Innovative Ideas Developed was done by our president Rishab Maurya and what we do was explained by our Vice president Ayush Somaiya. The Demonstration concluded recent Seminars, workshops, competitions and Achievements of RGIT's Robotics

Club and further benefits can be provided to the students with an experience in Robotics.

4. Line Follower Robot Competition in SFIT College

RGIT's Robotics Club has been participated in Robozone, St. Francis Institute of Technology. The Competition was about A.I based robot race. The Participants had to make an Automated Line follower Robot where the robot needs to fast enough to complete the route in a lesser time. The competition had 3 stages where the first Stage was technical Inspection, other two stages were about the race. The RRC team cleared first and second round but due to battery and motor fault the robot failed to run.



The Line Follower Robot Consists of a 12V battery
2 *12V Motor
Arduino nano
L298N Motor driver
5 Array Line sensor
Castor wheel
Jumper Wires
2* 7cm Wheels

5. Training Session for the RGIT's Robotics Club

In order to prepare for Upcoming Competitions RRC team decided to conduct a workshop for every week dividing the days with a specific department.

On Monday, Programming head Yash Gala taught to his team about logic building and code writing of a robot or Automation Process.

How the calibration and errors get resolved in a code were demonstrated.

On Tuesday, all of the Non-Technical Teams were working on their respective tasks such as marketing team were approaching different companies for sponsors, Digital Creativity team was teaching about the content creation e.g Reels, Posters, Presentations etc.

On Wednesday, Electronics team head Rutika Awale teachings about basics of Electronic Circuits and various sensors and their connections.

On Friday, Design Head Rishab Maurya proceeding with its Mechanical Design by using various softwares such as Inventor Professional, SolidWorks etc. and Design Process thinking.

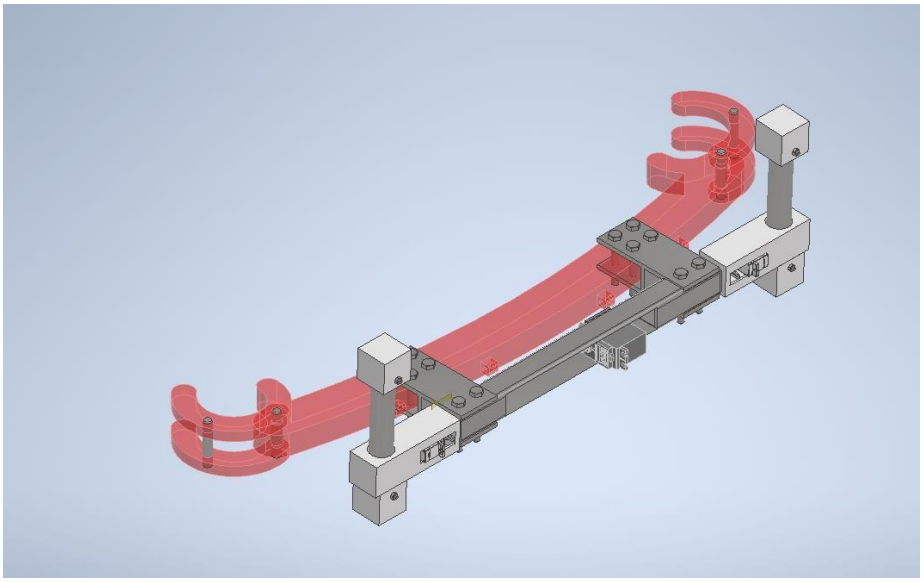
On Saturday, all of the teams coming together which provided a great experience and learning towards newcomers and it will continue for the next semester.

6. DD Robocon stage 1

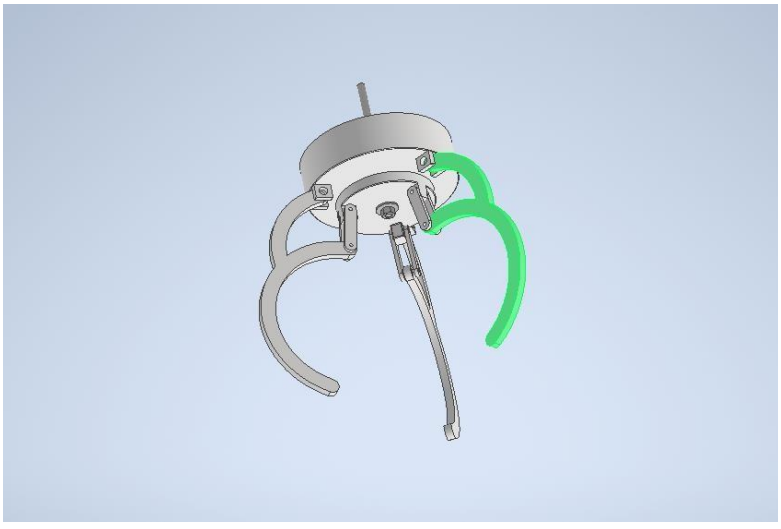
DD Robocon stage 1 includes the submission of following aspects:

1. Design Submission
2. Report Submission

Design Submission includes the design of robotic mechanisms which we have placed in the bot. The CAD model of the bot and its designs are designed on Autodesk Inventor Professional 2024 edition software. There were various problem solving sessions and discussions have been arranged to work through the problem statement. In the design Team, Design Head Rishab Maurya and Design team members Vipul Solanki and Divya madav had the major role in Designing and Problem solving methods. After solution and Designing, the models were discussed with different departments.



This is the design of Mechanism for 1st zone of Robocon 2024. This mechanism picks and places the seedling which are pole type structure using torsional spring, servo motor with compact structure.



This is the design of a gripper which works in 2nd and 3rd zone. This gripper picks and place the paddy rice or seedling which are in shape and size of volley ball. This mechanism works just like the other gripper.