



यात्रका

Design Challenge Rulebook

2024

... A key to future !!!



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1. INTRODUCTION

1.1. ABOUT MESA

The Mechanical Engineering Students Association, commonly referred to as MESA SFIT, serves as the distinguished student body representing the Mechanical Engineering department at St. Francis Institute of Technology. Its inception in the year 2019 marked the commencement of a visionary mission aimed at bridging the profound gap between academic knowledge and industrial application. With an unwavering commitment to excellence, MESA has become an integral part of the student's academic journey, providing a platform for holistic development and fostering a strong connection with the industry.

In essence, MESA SFIT stands as a beacon of excellence, diligently striving to empower students with a comprehensive skill set, industry-relevant knowledge, and a practical understanding of engineering applications. As the driving force behind teams GATEE and TEJAS, MESA exemplifies the institute's commitment to nurturing innovation, fostering industry connections, and ensuring a seamless integration of academia with the ever-evolving demands of the professional world.

1.2. ABOUT YANTRIKEY

यांत्रिकी ...A key to future!! is the flagship event of MESA SFIT. The word यांत्रिकी, means the study of mechanics, hence as the name suggests the event aims at providing students a key to explore the various opportunities available to them within the Mechanical stream and give them a clear vision of the current Industry scenario. A cardinal objective of यांत्रिकी is to afford students a panoramic view of the current industry scenario, allowing them to align their academic pursuits with the dynamic demands of the mechanical engineering sector.

The objective of the design challenge is to enhance the competitive spirit, problem-solving approach, and perspective thinking of students and will help them learn and inspect new concepts in CAD designing which is a major subject in the study of mechanical engineering.

The challenge not only serves as a crucible for fostering a culture of healthy competition but also acts as a catalyst for honing students' skills in Computer-Aided Design (CAD). Given the pivotal role of CAD designing in the study of mechanical engineering, the design challenge becomes a conduit for students to delve into new concepts, inspect innovative ideas, and fortify their grasp on this critical subject.

1.3. YANTRIKEY VISION

यांत्रिकी emerges as more than a mere event; it stands as a cornerstone in MESA SFIT's mission to equip Mechanical Engineering students with a holistic understanding of their field. By facilitating exposure to industry dynamics, cross-institutional academic perspectives, and hands-on experiences through the design challenge, यांत्रिकी endeavours to shape students into well-rounded, industry-ready professionals, poised to make significant contributions to the ever-evolving landscape of mechanical engineering.

A knowledge fair for engineers, the Design Challenge is a prize fight that will truly challenge your design skills and knowledge. ...A key to the future! An Interactive session with some of the most proficient people in the industry as you explore the field of Automation in Material Handling as a career choice A Key To Future...

1.4. THEME

AUTOMATION AND MATERIAL HANDLING

Automation and material handling refers to the use of technology and systems to streamline and optimize the movement, storage, and control of goods and products within a manufacturing or distribution facility. These processes are critical for enhancing efficiency, reducing labour costs, and improving overall productivity in various industries.

Automation:

Automation involves the use of technology, such as robotics, control systems, and computer software, to perform tasks and processes without direct human intervention. In industrial settings, automation can be applied to various operations, including manufacturing, assembly, and packaging. Automated systems can increase speed, accuracy, and consistency while minimizing errors and the need for manual labour.

Material Handling:

Material handling involves the movement, storage, and control of materials and products within a facility. Efficient material handling is essential for optimizing production processes, reducing costs, and improving overall supply chain management.



2. REGISTRATION REQUIREMENTS

2.1. TEAM REQUIREMENTS

The Team registering for the “YANTRIKEY 2024: A key to the future” event, participants should consist of two or four members. The participants from other colleges are advised to maintain discipline. The participants are not allowed to change the members of their team once registered.

2.2. TEAM REGISTRATION & FEES

Registration fees for the participants from other colleges are Rs.100/- per person except for SFIT Students the registration fee is Rs. 50/- per person. The participants are advised to fill out the Google form and pay the Registration fees.

For more details and updates go through our Instagram ID

<https://www.instagram.com/mesa.sfit/?igsh=MWJjb3NleTcwNHVnNg%3D%3D>

For registration go through our website

<https://mesa.sfit.ac.in/Yantrikey/Yantrikey/index1.html>

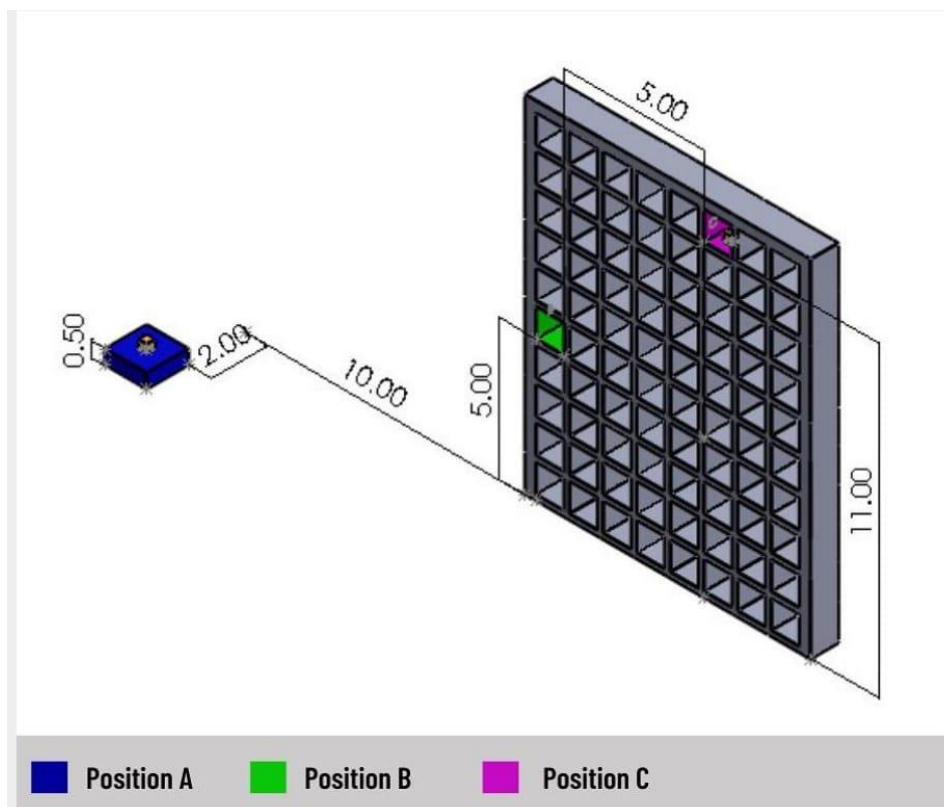
3. EVENT REQUIREMENT

3.1. PROBLEM STATEMENT (3D MODEL)

Problem Statement for Design Challenge Design a material handling system to perform the following sequence of operations as detailed below

1. Pick a Wooden Block of side 0.3 m from position A and place it at position B.
2. Pick another Wooden Block of side 0.3 m from position C and bring it to position A. Positions A, B and C are as shown in the figure.

NOTE: For reference figures and more detail about the design challenge problem statement please check out the official website.





3.2. RULES AND REGULATIONS.

1. Students must participate in a group consisting of a maximum of (2 - 4) members.
2. The design can be done on any 3D modelling CAD software.
3. On the day of the competition i.e. 14th of March 2024, there will be a live presentation of a maximum of 10 minutes before the judges followed by a Q&A session of 5 minutes.
4. No physical model to be manufactured.
5. Design-based report justifying the design parameters, and dimensions, if any, that have been adopted for the project must be submitted in the form of a hard copy.
6. More weightage will be given to the minimum number of mechanisms/linkages.
7. Animation for the working of mechanism of at least 1 cycle must be prepared and demonstrated.
8. The object (0.3m block) should be placed inside the shelf and not on the edge of the shelf.
10. Design will be assessed based on ease of manufacturing, assembly and working of mechanism.

4. TECHNICAL PRESENTATION/ REPORT

4.1. TECHNICAL PRESENTATION REQUIREMENTS

- The Technical Presentation should be made in Microsoft PowerPoint with a font size for content 12 and in a font style of Times New Roman.
- The Technical Presentation shall last ten (10) minutes and be followed by a five (5) minute “Question and Answer” (Q&A) period.
- For the headline the font size will be 14 and the font style will be the same as Times New Roman.
- The Participants are advised to bring their pen drive for the presentation of their Model.
- The presentation should not exceed more than 10 slides.
- The report should not exceed more than 20 pages, the format should be the same as the PowerPoint presentation.
- There should be Yantrikey logo and the top right corner on all the pages.
- The format of the report/presentation should be as follows:
 1. TITLE
 2. INTRODUCTION
 3. PROBLEM STATEMENT
 4. CAD MODEL (Solution of the problem statement)
 5. CONCEPT(Explanation of the CAD model)
 6. CONCLUSION

4.2. TECHNICAL PRESENTATION PROCESS

- The Presentation room will have 2 or 3 judges to grade the presentation and the model.
- The model should explain the industry's problem and the solution to solve the problem.
- Each member of the participants is required to speak about the presentation and their CAD Model.
- The Cad model should explain the solution to the problem statement.
- The report should be submitted before starting the presentation.
- The following format should be strictly followed and members should be present 30 minutes before the start of the presentation.

5. JUDGING CRITERIA AND GUIDELINES.

	MARKS ALLOTTED
CONCEPT	50
CAD DESIGN	50
FEASIBILITY OF MANUFACTURING	50
REPORT	30
PRESENTATION	20
TOTAL	200

1. Students must participate in a group consisting of maximum (2-4) members
2. The design can be done on any 3D modelling software of choice
3. On the day of the competition i.e. 14th March 2024, there will be a live presentation of maximum 10 minutes before the judges followed by a Q&A session of 5 minutes
4. No physical model to be manufactured
5. Design based report justifying the design parameters, methodology and calculations, if any that have been adopted for the project.
6. Minimal number of mechanisms/linkages
7. Entire mechanism must occupy minimum space.
8. Animation for working of mechanism on at least 1 cycle must be prepared
9. Object (0.3m block) should remain inside the shelf and not on the edges
10. Industrial feasibility



6. PANEL DISCUSSION

- Panel discussions can be highly beneficial for students of mechanical engineering for several reasons:
 1. **Exposure to Diverse Perspectives:** Panel discussions often involve experts from various fields within mechanical engineering, providing students with insights into different specializations, industry trends, and emerging technologies.
 2. **Networking Opportunities:** Students can connect with professionals, professors, and fellow students during panel discussions, creating valuable networking opportunities for internships, research collaborations, or future career prospects.
 3. **Real-world Application:** Panelists often share their experiences and practical knowledge, bridging the gap between theoretical concepts taught in classrooms and their real-world applications in industries or research.
 4. **Critical Thinking and Problem-solving Skills:** Listening to panelists discuss complex engineering problems, challenges, and solutions helps students develop critical thinking and problem-solving skills, essential for success in their academic and professional endeavors.
 5. **Career Guidance and Mentoring:** Panel discussions often include Q&A sessions where students can seek advice, guidance, and mentorship from experienced professionals, helping them make informed decisions about their career paths and academic pursuits.
 6. **Experiential Learning:** Panel discussions offer a dynamic learning environment outside traditional classroom settings, allowing students to engage in interactive discussions, ask questions, and learn from real-world examples shared by industry experts.