

21st July 2023



ENGINEERING EXPLORATION



KLE

TECHNOLOGICAL UNIVERSITY

Creating Value, Leveraging Knowledge

(Incorporated under KLE Technological University Act-2012: Karnataka Act No. 22 of 2013, AICTE Approved)

Dr. M. S. Sheshgiri College of Engineering and Technology,
Belagavi, Karnataka | Ph: 0831-2440322



ENGINEERING EXPLORATION TEAM



MESSAGE FROM

Vice Chancellor



KLE Technological University's constituent college at Belagavi received the first batch of undergraduate engineering students affiliated to KLE Tech during 2021. A new learning phase post pandemic demands more student-centric learning method as students are switching from online to offline mode of learning the engineering curriculum. The passion and potential in these students were harnessed through the innovative learning environment at KLE Tech. As always, the students, through their dedication, demonstrated their skills with a new project-based learning approach. As the semester ends, we celebrated their resounding success in the first-year course Engineering Exploration course.

The first-year course - "Engineering Exploration", designed by the Centre for Engineering Education Research is one of the signature courses at this University. This course focuses on engineering problem solving, multi-disciplinary skills required in Problem Solving and Teamwork.

In the very first year of the course delivery at KLE Tech. Belagavi campus, students from different Departments working with diverse group were opened to various ideas for solving the problem.

The interactive sessions during the course helped the students to learn skills required for an engineering graduate. The practice of exhibiting students' projects at the end of the semester helps students learn from their peers.

The exhibition titled "Prayog Varsh 2023" is being conducted on July 21st, 2023 at the campus. This exhibition is going to showcase 70+ course projects done by the first-year undergraduate engineering students of Electrical stream.

I congratulate students and faculty members for showing how perseverance breeds success.

DR. ASHOK S. SHETTAR
Vice-Chancellor,
KLE Technological University, Hubballi.

Engineering Exploration

@KLE MSSCET (KLE Tech, Belagavi Campus)

“Engineering Exploration” course is a unique innovation born in the educational ecosystem of KLE Tech.

This first-year course is co-designed and team taught by faculty members from multiple engineering disciplines. It focuses on problem solving, engineering design, multi-disciplinary skills, ethics and sustainability.

It follows PBL pedagogy and students work in teams to solve identified problems. All projects designed by students in this course are Arduino based and are built using several electrical and electronic components. The common actuators like DC motor, servo motor and stepper motors are used. Prayog is an exhibition conducted as a Prayog Varsh in the last week of even semester.

It serves as a platform for peer learning and celebration of student' success.

Total of 70+ projects done by 250 first year students are being showcased in this event.



MESSAGE FROM

Principal



Engineering Exploration course is being implemented by KLE Technological University, Belagavi campus to encourage students to connect to real world engineering problems and offer innovative solutions by building products. The course offers students opportunity to experience entrepreneurial approach at First year level. By the time they complete undergraduate program students will have opportunities to convert these prototype products into commercial products and become successful entrepreneur. The main aim of this course is to explore ideas to transform knowledge into tangible objective, enhance teamwork and interpersonal skills, understand, and apply project management concepts and solve problems in society.

The First-year students have shown tremendous enthusiasm in this course learning and developed projects which are being exhibited on 21st July 2023.

I wish this event a grand success and congratulate students and faculty members for their continuous efforts.

DR. S. F. Patil

Principal

KLE Dr. M. S. Sheshgiri College of
Engineering & Technology, Belagavi



Sl. No.	Title, Mentor Names and Need Statement
1	Industrial Robot Prof. R N Chikkangoudar A private school shown the interest to demonstrate the working of industrial robot to students, to create interest in area of robotics.
2	Smart Segregator Prof. M. Sadiq A. Pachapuri Belagavi based scrap dealer wants a machine to sort different scraps (Plastic, Glass, Metal Etc.)
3	Automatic Medicine Dispensing Kit Prof. Sushant Jadhav A Belagavi based small scale industry wishes to have an automatic first aid Dispensing system.
4	Semi-Automatic Floor Cleaner Prof. Anita H Shirol Retailers in Belagavi have a great reason to get excited as a brand new Automatic Floor Cleaning machine.
5	Interactive Science Model Prof. Niranjan Pattar The educational institutions in Belagavi are in need of interactive science models that can serve as effective tools to demonstrate the fundamental principles of science covered in the curriculum.
6	Automatic solar panel cleaning Prof. Abhinay Gupta An industry have installed solar panel at their premises want to have one automatic solar panel cleaning system for the same.
7	Packaging system Prof. Swati Mavinkattimath A XYZ client requires an automatic packaging system for his manufactured or processed product.
8	Public Safety System Prof. Kiran Hubli Local Administration authority needs man less and instant system which shall work for the sake for public safety.
9	Smart Cradle Prof. Vijay Rayar An industry wishes to make automation for Cradles to help the hospital staff/Mother to take care of new born babies.
10	Pattern Drawing Machine Prof. B G Koujalagi In an art and craft supply store, there is a need of a machine that can draw different shapes and patterns.



Sl. No.	Title, Mentor Names and Need Statement
11	Game Machines Prof. Anirudha Potdar A mall in Belagavi has a games zone center that needs a machine to be used by people for entertainment.
12	Automatic Milk pouch vending Machine Prof. Rakesh B Halligudi A shop in Belagavi is in need of an automatic milk pouch vending machine which should provide the required type and quality of milk pouch.
13	Innovative Toy (Launching Device) Prof. Sandeep Kudal "S n K" Toy Company is in need of an innovative toy for children to be made, which involves mechanism and launches certain objects, this toy is safe for the kids to play with.
14	Wall Painting Machine Prof. Santosh Nandurkar A painting contractor needs a device which will help to paint the walls of building from inside and outside and to overcome the labour shortage.
15	Smart Equipment for sports Prof. Tushar Birje A sports complex from Hubli requires smart equipment's to use while conducting sports activity and practice sessions for indoor and outdoor games.
16	Stair Lift Prof. Shreyas Walvekar A civil contractor wants to facilitate the vertical/inclined means of transportation inside the residential building for physically challenged and old age people.
17	Semi-Automatic Chocolates dispensing machine Prof. Sachidananda T G A Stationary shop owner needs a semi-automatic chocolate dispensing machine which is portable.
18	Chalk Dispensing Machine Prof. Kunjan Shinde KLE Technological University requires a system to dispense chalk.
19	Grain Filtering Machine Prof. Tushar Birje A NGO needs grain filtering system for food processing.
20	Smart Storage Prof. Shishir Patil A Dharwad High Court Advocate is in a need of Portable bin which can segregate files and documents so that he can preserve them safely.

Industrial Robot

Mentor : **Prof.R.N. Chikkangoudar**

Need Statement : **A private school shown the interest to demonstrate the working of industrial robot to students, to create interest in area of robotics.**

Abstract : Robot configurations play a crucial role in determining the capabilities and applications of robotic systems. This abstract provides a concise overview of four common robot configurations: Cartesian, SCARA (Selective Compliance Assembly Robot Arm), cylindrical, and delta robots. Each configuration possesses unique characteristics that make them suitable for specific tasks and industries.

The Cartesian robot configuration, characterized by its three perpendicular linear axes of motion, offers precise control and accuracy. SCARA robots, known for their horizontally extended arms and vertical Z-axis motion, provide excellent speed and flexibility. Cylindrical robots exhibit a cylindrical workspace due to their combination of rotational and linear motion capabilities. With their ability to perform tasks in a cylindrical coordinate system. Delta robots feature a unique parallel kinematic structure with multiple arms connected to a common base. These robots are renowned for their incredible speed, precision, and agility.

In conclusion, the choice of robot configuration plays a pivotal role in designing robotic systems for various applications. The Cartesian, SCARA, cylindrical, and delta configurations offer distinct advantages and are deployed in diverse industries. The selection of an appropriate configuration depends on the specific requirements of the task at hand, enabling efficient and effective automation in the modern era.



In Exploration course we learnt how to convert idea to reality.

Soumya N Patil



This course has given me the knowledge of project management, technical analysis and team work.

Stuti K Hunachagi

This course helped me to understand programming in better way.

Sanjana Aralikatti

Smart Segregator

Mentor : Prof. M. Sadiq A. Pachapuri

Need Statement : Belagavi based scrap dealer wants a machine to sort different scraps (Plastic, Glass, Metal Etc.)

Abstract : The increasing global concern for environmental sustainability has led to a growing emphasis on waste management and recycling. Sorting waste plays a crucial role in optimizing recycling processes, reducing landfill waste, and minimizing environmental impact. The importance of waste sorting, different sorting techniques, and their impact on waste management systems. It involves the categorization and separation of different types of waste materials based on their properties, such as composition, size, and recyclability.

Sorting waste at the source or through advanced waste management facilities allows for the identification and extraction of recyclable materials, which can be diverted from landfills and reintroduced into the production cycle. These techniques include manual sorting, automated sorting using optical sensors, magnetic separation, eddy current separation, air classification, and density-based sorting. On the other hand, automated sorting relies on advanced technologies to sort waste at high speeds and with greater accuracy. The implementation of effective waste sorting systems offers numerous benefits. Firstly, it reduces the volume of waste sent to landfills, thus minimizing environmental pollution and conserving valuable land resources.

Secondly, it maximizes resource recovery by extracting valuable materials for recycling, reducing the need for raw material extraction and associated energy consumption. Thirdly, it improves the quality of recycled materials, ensuring that they meet industry standards and can be utilized in the production of new products. Challenges in waste sorting include the variability and complexity of waste streams, the need for advanced sorting technologies, and the importance of public awareness and participation. Ensuring a consistent supply of high-quality recyclable materials requires continuous research and development of innovative sorting techniques.



The Engineering Exploration Lab provides a valuable hands-on experience for students to explore various engineering disciplines. The range of activities, knowledgeable staff, and integration of technology create a conducive learning environment. Aligning lab activities closely with core curriculum and offering more complex challenges would enhance the overall experience.

Samiksha G

The Engineering Exploration Lab offers a diverse range of hands-on activities and resources for students to explore engineering disciplines. The supportive staff, well-equipped facilities, and emphasis on collaboration enhance the learning experience.

Sana Mulla

The Engineering Exploration Lab at provides an immersive and interactive learning experience for students interested in engineering. The variety of disciplines, hands-on experiments, and guidance from knowledgeable staff foster a solid foundation.

Saniya Akram

Automatic Medicine Dispensing Kit

Mentor : **Prof. Sushant Jadhav**

Need Statement : **A Belagavi based small scale industry wishes to have an automatic first aid Dispensing system.**

Abstract : In recent times the use of machines in society for various aspects such as the pharmaceutical industry and medical purposes was increased. The automated medicine dispensing kits are easy to program, simple to operate, and compatible with all valve types and controllers. They are designed and configured specifically for fluid and pills dispensing applications. The students have designed a project to dispense pills, cotton, bandage, Dettol and controlled by an Arduino mega controller through which the machine is controlled using DC motor, servo motor and IR sensors are used to receive input as well as to detect stock empty. It's approximate weight is 1.5 KG. The total current consumed is 1102mA. When fully charged, a 2200 mAh capacity battery works continuously for 4 hours. The project exhibits functions like dispensing, notify after dispensing, and also notify after the stock gets over. The user can control these robots. The students have developed virtual models of the Medicine Dispensing kit using Autodesk Inventor for modelling and simulation and Tinker cad for circuit designing.



The course incorporated essential project management principles and techniques, which proved invaluable in guiding us through the different stages of our projects. We learned about project planning, scheduling, resource allocation, and risk management, among other crucial aspects.

Akhilesh Joshi

Engineering Exploration provides students with a broad overview of different engineering disciplines. The subject incorporates practical experiences such as hands-on projects, and laboratory experiments. Students have opportunities to apply theoretical concepts learned in the classroom to real-world scenarios. This course helps students to explore career paths within engineering. Includes hands-on projects and practical experiences. Encourages critical thinking and problem-solving skills. Promotes interdisciplinary thinking and collaboration.

Daivik Naik

I am grateful and happy to provide feedback about this course, as this course has given me a lot more knowledge about mechatronics systems, and about how machines work with the knowledge of electronics, mechanical, and programming. The staff which we had got were really helpful and helped us to develop more knowledge about the working principles and with excellent guidance, I am very thankful for the kle tech and staff.

Priyanka Patil

Semi-Automatic Floor Cleaner

Mentor : Prof. Anita H Shirol

Need Statement : Retailers in Belagavi have a great reason to get excited as a brand new Automatic Floor Cleaning machine.

Abstract : Modern households are becoming more automated thereby delivering convenience and reducing time spent on house chores. While vacuum cleaners have made home cleaning easier they are largely nosy and bulky for everyday use. Here we report the development of a compact and efficient cleaner robot for potential office and home use. Efforts have been put by students to build Robot which can clean floor both: dry cleaning and cleaning with wet cloth. The developed robot is equipped with vacuuming and cleaning and Mopping technology and controlled by an Arduino mega controller through which the machine is controlled using DC motors, actuators, bevel gears, teeth belt drives, mops, tyres, servo motor and ultrasonic sensors to detect any obstacles/Walls. It's approx. weight is 1.5 KG. The total current consumed is 1102mA. When fully charged, a 2200 mAh capacity battery works continuously for 4 hours and cleans the floor efficiently. It is managed through a Bluetooth app where the user can set the timings and all other movements which he wants to pass. With its capability, the device will be deployed for home use as well as office use thereby making cleaning a fully autonomous duty.



Engineering exploration helps us to deal with various types of machines. It provides hands-on experience in integrating hardware and software, enabling practical application of engineering concepts for designing and controlling mechatronics systems.

Shantanu A. Kulkarni

The course is beautifully designed. We have a great learning experience, more of practical knowledge with many interesting examples and interesting tasks to go with our project. It also teaches us Project Management. It covers major Engineering Projects and the activities are demanding enough to challenge the students to think in a different way.

Shravani Desai

In this we had learnt a lot of things more about machines. And had various of task in which we had learnt as well as enjoyed the task. This subject had made us to think varieties of ideas and it helps us to know more about engineering projects in which different engineering fields and it has also helped us into solve real world problems and to innovate new products.

Shreya G. Ghatage

Interactive Science Model

Mentor : **Prof. Niranjan Pattar**

Need Statement : **The educational institutions in Belagavi are in need of interactive science models that can serve as effective tools to demonstrate the fundamental principles of science covered in the curriculum.**

Abstract : Interactive science models utilizing Arduino have emerged as a valuable approach to science education, providing students with hands-on experiences that promote active learning and technological literacy. Arduino, an open-source microcontroller platform, enables the creation of interactive models by integrating sensors, actuators, and programming capabilities. By incorporating Arduino into interactive science models, students can explore and understand scientific principles in a tangible and engaging manner. They can build and program their own models, allowing for customization and experimentation. This hands-on approach fosters a deeper understanding of scientific concepts and encourages critical thinking and problem-solving skills. Arduino-based interactive science models offer a wide range of possibilities. Students can design models that simulate real-world phenomena, such as solar system, regenerative braking, or IC engines. They can collect data through sensors, process it using programming logic, and create interactive outputs through actuators. This interactive feedback loop enhances students' ability to analyze and interpret scientific data. Moreover, Arduino's open-source nature promotes collaboration and knowledge-sharing among students and educators. They can access a vast online community of Arduino enthusiasts, sharing project ideas, troubleshooting challenges, and exploring innovative applications of the technology. This collaborative aspect cultivates teamwork, communication, and a sense of curiosity and exploration. By utilizing Arduino in interactive science models, educators can empower students to become active participants in their own learning. This approach not only enhances scientific literacy but also nurtures technological skills that are increasingly relevant in today's digital world. Ultimately, Arduino-based interactive science models provide an effective and engaging means to inspire and educate the scientists and innovators of tomorrow.

The engineering exploration course fosters practical learning, interdisciplinary understanding, teamwork, sustainability, and project management skills, while providing hands-on access to advanced tools at KLE Tech Belgavi .

Amogh G



Our mentor's explanation of laser cutting and 3D printing fueled our eagerness to visit the Exploration studio/ thinking lab. Witnessing cutting-edge technologies firsth and enriched our engineering journey, expanding our knowledge and passion.

Anish



The course provided valuable insights into engineering processes, ethics, components, communication technologies, design steps, teamwork, project management, and exploration. It was informative, engaging, and well-organized.

Radhika

Automatic solar panel cleaning

Mentor : Prof. Abhinay Gupta

Need Statement : An industry have installed solar panel at their premises want to have one automatic solar panel cleaning system for the same.

Abstract : The Automatic Solar Panel Cleaning System is an innovative project aimed at improving the efficiency and longevity of solar panels by automating the cleaning process. Solar panels are a popular and sustainable source of energy, but their performance can be significantly affected by the accumulation of dirt, dust, and other debris on their surface. Regular cleaning is essential to ensure optimal energy production, but manual cleaning can be time-consuming, labour-intensive, and costly. This project proposes a solution to address these challenges by developing an automated system that cleans solar panels effectively and efficiently. The system utilizes a combination of technology, sensing mechanisms, and intelligent algorithms to detect and remove dirt from the surface of solar panels without human intervention. The core components of the system include an Arduino, motors equipped with brushes or wipers, sensors for detecting dirt accumulation, and a control system that orchestrates the cleaning process. The proposed system offers several advantages over manual cleaning methods. It eliminates the need for human labour, reducing operational costs and increasing the efficiency of solar panel maintenance. Moreover, the automation enables frequent and timely cleaning, preventing the built-up of dirt and maximizing the energy output of the panels.



The Engineering Exploration course was an amazing experience. I learned how to work together with my team and solve problems creatively. It made me feel excited about engineering and gave me confidence in my abilities.

Lalitkumar Solapure

This course helped to explore engineering and get exposed to engineering. This course taught how a single problem can be solved by using various methods. Overall engineering exploration is 'one of the interesting course.

Patadayya G. Chikkamath



The engineering exploration program established a strong foundation in programming and mechatronics through practical implementation in different exercises. This hands-on experience enhanced our skills and It bridged the gap between theory and practical.

Mohammed Qadir Ternikar

Packaging System

Mentor : Prof. Swati Mavinkattimath

Need Statement : A XYZ client requires an automatic packaging system for his manufactured or processed product.

Abstract : An automatic ball packaging system is a machine or assembly line designed to automatically package balls, such as sports balls or industrial balls, in a streamlined and efficient manner. It typically involves a series of interconnected processes and components that work together to package the balls in a consistent and automated fashion. The specific design and features of an automatic ball packaging system can vary depending on the requirements of the application, such as the type and size of balls, desired packaging materials, and production volume.

An automatic grain packaging system showcases the system's ability to streamline and enhance the packaging process for various types of grains. By incorporating advanced automation and precision measurement technologies, the system ensures accurate and rapid packaging of grains, minimizing product loss and optimizing packaging materials usage. It offers user-friendly controls and adheres to stringent safety and hygiene standards. With its ability to maintain product integrity and quality, the system meets the demands of high-volume grain packaging operations, boosting productivity and efficiency in the agricultural and food industries



The course has evolved through the combined effort of multi-disciplinary students in a team. And today we have learned so many good skills like problem-solving to multi-disciplinary, teamwork, and collaborator that can help in the future of our engineering studies.

Dhanuah Irappa Kamatar

Engineering exploration is an innovative and creative learning environment. Here I can explore and implement many circuits and mechanisms. This course helped me to build practical knowledge and develop my skills.

Akash I. Potdar

Engineering exploration is such a wonderful experience, it was challenging, meaningful, and deeply fulfilling. Working on the project made me more active as a volunteer, coordination is the main key to achieving the result.

Mitali M Karte

Public Safety System

Mentor : Prof. Kiran Hubli

Need Statement : Local Administration authority needs man less and instant system which shall work for the sake for public safety.

Abstract : The project "Mechatronics Solutions for Public Safety" aims to address various aspects of public safety by employing advanced mechatronic systems. The project focuses on four key areas: women's safety, automatic zebra crossing, traffic control robot, and automatic brake application for the dizziness of the driver. In the context of women's safety, the project proposes a wearable device integrated with sensors and mechanism modules to threaten the opponent. The device protects women during potential threats or emergencies, enabling prompt assistance. The automatic zebra crossing system aims to enhance pedestrian safety by employing mechatronics technologies. The system utilizes sensors, and traffic control algorithms to enable pedestrians to cross the road through the mechanism. The traffic control robot is designed to assist in managing traffic flow at intersections. To address driver dizziness-related accidents, the project proposes an automatic brake application system. Through the integration of mechatronics technologies, these solutions strive to improve public safety in different scenarios. The project's outcomes have the potential to create safer environments for women, enhance pedestrian safety at zebra crossings, optimize traffic flow with a traffic control robot, and prevent accidents caused by driver dizziness. The implementation of these systems can significantly contribute to reducing accidents, enhancing public safety, and ultimately improving the quality of life in urban areas.



This course has offered us great knowledge of self-esteem, teamwork, and project management with real-time constraints. We enjoyed this course with lots of enthusiasm and entertainment in the studio and the thinking lab.

Seeba Doddmani

Engineering Exploration was a great subject to learn about. It helps me a lot to learn about many different things and how things differ from the user's perspective. Course was very joyful with team coordination and mentor's support.

Sharanamma S. Katti

The engineering exploration course is based on teamwork. we learnt how to collaborate with team and for one problem there is many solutions learnt by team and this course. Thank you sir for a support on our project.

Sejal Chavan

Smart Cradle

Mentor : **Prof. Vijay Rayar**

Need Statement : **An industry wishes to make automation for Cradles to help the hospital staff/Mother to take care of new born babies.**

Abstract : Smart cradles have the ability to change the field of childcare in the most reliable way be it comfort, automation in assisting the caretakers at the hospitals, and of course mothers at houses. Therefore to facilitate the same we have come up with a model that performs some of the smart activities that a smart cradle does; automatic swinging with speed control capabilities, moisture sensing in case the baby has wet the bed, and alert the caretaker if the baby cries. The collected data via sensors by the environment(the cradle) is transmitted wirelessly through Bluetooth to a mobile application allowing monitoring remotely and notification if in case the issue requires attention in the form of beep alerting. Additional features which improve the sleeping experience of the baby include rotating toys at the top of the cradle and soothing music can be played along with it. The ability to remote monitor through the MIT app helps the caretaker to do other work along with controlling the cradle activities. This project can evolve with time and dedicated work on it, as it has the potential to become an essential tool for caretakers, ensuring the well-being of infants while enhancing the overall parenting experience and improving safety.



Engineering exploration has given us an invaluable opportunity to learn and apply proper planning, management, execution and implementation. Along with that, the most fun part is we get to learn the working of different mechanisms in the sessions making us aware of the real-world systems with hands-on experience in performing similar activities in the tinkering lab and creating our own project..

Preeti P.

The engineering exploration course gave an exposure to engineering design, Learnt about the multidisciplinary nature of engineering along with professional ethics.

Smarth Kattimani

The engineering exploration course gave us a valuable experience in project management, and engineering design concepts.

Sakshi Sonoli

Pattern Drawing Machine

Mentor : Prof. B G Koujalagi

Need Statement : In an art and craft supply store, there is a need of a machine that can draw different shapes and patterns.

Abstract : This work describes the design and fabrication of a pattern drawing machine. The main components of this low-cost machine are an Arduino controller, pen writer, stepper motor, servo motor, and motor drivers. The working of this system is based on source codes. Drawing perfect sketches by hand can now be done by machines too. Here we propose a semi-automated pattern drawing machine that sketches drawings similar to real humans but with a lot more accuracy. The proposed system makes use of an Arduino-based circuit that is interfaced with motors, timing belts, gears, rope, and a lead screw-based setup that is used to provide the mechanism needed by a pen to draw the pattern. The Arduino-based circuit is interfaced with 2 stepper motors and 1 servo motor in order to transmit the movement commands as per the code fed to it. It then controls the sketching process through a well-controlled mechanism in order to achieve this task. The pen only touches the paper where a dot is to be placed and is raised above the paper by the servo motor where the sketching is not needed. This motion coupled with the X and Y axis movement of the motors allows for a 2D sketching mechanism on the paper.



The Engineering Exploration course was an amazing experience that taught us valuable teamwork skills and gained a deep understanding of engineering principles, making it a highly beneficial and enjoyable course. I personally enjoyed the course.

Gouresh Hiremath



From the Engineering Exploration course, I learned how different disciplines of engineering are required to solve a given problem step by step and how important is communication and teamwork for project work.

Aditya Kumar

Engineering Exploration helped me to understand what is engineering and the importance of teamwork and learned how to build a mechatronics device from the mechanism and the software..

Vishwanath A.

Game Machines

Mentor : **Prof. Anirudha Potdar**

Need Statement : **A mall in Belagavi has a games zone center that needs a machine to be used by people for entertainment.**

Abstract : Game machines are included in the malls for the entertainment of kids. In our need statement, four different games are developed. Group no E9 has developed a game called air hockey striker. It involves a goalpost similar to that of hockey. A player is given a chance to strike the ball manually into the goal post. The goalkeeper uses a sliding mechanism for protecting the ball which is continuously moving across the goal. When a player scores a goal using the IR sensor, the score is displayed on the led screen. Group E10 has developed a game "Kick-Score and Win". The game machine consists of a launcher through which a player sets a direction and tries to launch the ball into the goalpost, where a continuously moving goalkeeper using a linkage mechanism acts as an obstacle and avoids the ball into the goalpost. Group no E11 has developed a mini basketball arcade consisting of three baskets. A player shoots the balls from a distance using a rotatable launcher which is moving from left to right to a respective basket. The score is calculated based on the distance of the basket from the launcher. The launcher is moving from left to right using rack and pinion mechanism. Group no E12 developed a game "Smash-A-Mole". It is a game where players test their reflexes by attempting to hit moles for scoring points that pop up randomly from various holes and a player should hit the object correctly. The moles are moving up and down using a linkage mechanism.



Engineering exploration was a completely different and unique experience for all of us. It inculcated team spirit, exhibited creativity and innovation showcasing our ability to think critically and provide unique solutions.

Snigdha

Learning ENGINEERING EXPLORATION involved a high level of skills, interest in model making, dedication, creativity, innovative ideas, and team spirit. It increased our skills and provided an opportunity to put forward our own ideas.

Shreya Kallur

Engineering Exploration is a Team- taught course that focuses mainly on Hands-On projects where all the team members come up with their own ideas. It focused on Problem Solving, Engineering Design, and Multi-Disciplinary Skills.

Om Hugar

Automatic Milk pouch vending Machine

Mentor : Prof. Rakesh B. Halligudi

Need Statement : **A shop in Belagavi is in need of an automatic milk pouch vending machine which should provide the required type and quality of milk pouch.**

Abstract : This project intends to address the challenges faced in traditional milk distribution, such as manual handling, limited availability, and time-consuming processes. By implementing a milk pouch vending machine, several benefits can be achieved, including reducing human intervention, ensuring product freshness, improving accessibility, and maximizing operational efficiency. The methodology involves designing and manufacturing a user-friendly vending machine prototype with a focus on hygiene standards and safety regulations. Through market research and analysis, customer preferences and demands will be identified to optimize the machine's features. This project holds significant potential for various stakeholders in the dairy industry, including farmers, consumers, and retailers. Farmers can enhance their market reach while ensuring fair prices for their products. Consumers can enjoy round-the-clock access to fresh milk while having control over their purchase quantities. Retailers can streamline their operations by leveraging this automated system. Overall, the milk pouch vending machine project strives to offer a convenient solution to milk distribution challenges by introducing an innovative self-service concept that benefits all involved parties.



The projects given in the Exploration lab were valuable learning experience, despite facing some challenges. It enhanced my problem-solving skills and provided insights into automation technology, which will be beneficial for my future endeavours.

Srushti Sheetal Padanadi



Through this project, we learned about teamwork, problem-solving, and time management. We faced technical glitches but gained valuable experience for future projects.

Anil Pednekar



Our project taught us resilience, adaptability, and effective communication. Despite challenges, we gained valuable skills to succeed in future endeavours.

Amogh Sharanar



Innovative Toy (Launching Device)

Mentor : Prof. Sandeep Kudal

Need Statement : "S n K" Toy Company is in need of an innovative toy for children to be made, which involves mechanism and launches certain objects, this toy is safe for the kids to play with.

Abstract : Children learn best when they are engaged and having fun. Launching mechanism toys offer a hands-on experience that encourages experimentation, logical thinking, and the application of scientific principles. Children develop motor skills, spatial awareness, and an understanding of cause and effect. This innovative toy combines fun and education by enabling children to explore the principles of physics, engineering, and problem-solving through play. Here in our projects - launching devices, which are combined with sensor and motor drives with programmable controllers; we have movement of machine which can be controlled by Bluetooth module and launching system which can engage the children in having fun. We have developed an app with which we control the movement of our toy, once in position it will launch a cannon ball (soft toy ball) targeting the enemy gates in the game. In another project a catapult is prepared, which is a ballistic device used to launch a projectile at a distance without the aid of any propellants to target the enemy gates in a game. We have developed a Table tennis ball launcher as well which will help the user to play without any opponent. Also there is a pin-ball machine prepared which will enhance the skill of player by aiming the ball to target, thereby providing fun to users while playing and also educating by enabling children to explore many ideas is the motto of these projects. All the projects involve various mechanisms enabled with electronics involving IR, ultrasonic sensors etc.



"We learnt about Mechatronics, it was fun learning by activities involving projects which was multi-disciplinary in nature"

Sejal Jadhav



"It was amazing experience learnt about designing and implementing the same"

Pratiksha Angadi



"Operating various machinery involved in projects and programming was fun"

Tejas Bamane



Wall Painting Machine

Mentor : **Prof. Santosh Nandurkar**

Need Statement : **A painting contractor needs a device which will help to paint the walls of building from inside and outside and to overcome the labour shortage.**

Abstract : In this project, Design and fabrication of Semi-automatic Wall Painting Machine is done to address the risks associated with painting of walls of buildings. The safety of manual painters working on tall buildings is a critical concern for painting contractors. In response to this need, the development of a specialized device that aims to mitigate the shortage of labours and accidental death during exterior wall painting is proposed. It uses different motors and mechanisms along with various electronic components to serve the purpose. It also indicates start and stops of the process as well as detects wall in front of it. As this device is easily portable and semi-automatic it significantly reduces the risks associated with painting of walls. The height of device can be easily adjusted and paint will be applied uniformly over the surface. It offers a reliable and safe solution for painters. The design and fabrication of device uses the concepts of Engineering design process, platform based development using Arduino programming, sustainable development, project management and professional ethics. This device will provide a practical solution for painters by enabling them to work from outside the building while ensuring their safety. By implementing this device, we aim to offer an effective and reliable alternative for manual painters, minimizing the dangers associated with working at heights and enhancing overall safety standards in the painting industry.

The engineering exploration course sparked my interest in solving problems, exposed me to problems in the real world, and pushed my curiosity to new levels. I discovered a world of creativity, innovation, and teamwork at the engineering exploration lab, which fuelled my desire to be the best in my field. The engineering exploration lab stretched me beyond of my comfort zone and encouraged genuine enthusiasm for problem-solving and lifelong learning. It challenged me to think critically and creatively.

Swapnil Laxman Shahapurkar

Engineering Exploration was very Fun & Creative experience as we learnt how to work in a team with different set of roles assigned to accomplish the end product. It was very interesting and motivating to learn about coding and different software's.

Anurag Chougule

By Engineering Exploration course we have learnt to focus on problem solving, Engineering Design, Multi-disciplinary skills and Ethics. Here we have applied mechatronics and mechanisms to achieve our models. By team work we have learnt the time management and distribution of works.

Bhagyashree Jainapur



Smart Equipment for Sports

Mentor : Prof. Tushar Birje

Need Statement : **A sports complex from Hubli requires smart equipment's to use while conducting sports activity and practice sessions for indoor and outdoor games.**

Abstract : The sports complex is focused on improving the overall experience and efficiency of conducting sports activities within its premises, both indoors and outdoors. By integrating smart technologies into the equipment used during sports activities, the complex aims to provide a modern and innovative environment for athletes and sports enthusiasts. Smart sports equipment are those sports equipment that are digitally connected with sensors and allow sports persons or athletes to monitor, track, analyse, and improve their performance. The adoption of smart techniques in various sports equipment such as water sports, tennis, basketball, football, and more enables users to get new and advance features, which are not available with the traditional sport equipment. A sport person cannot get these features and benefits by using a traditional sports equipment .Thus, this factor drives the growth of the smart sports equipment market. Smart sports equipment such as smart helmet, smart sports wearable's, and others offer athletes safety as they help in tracking heart rate and protect them from injuries. These features help increase their demand among the coaches and sport persons thus contributing in fostering the growth of the smart sports equipment market

This abstract underscores the significance of embracing technological advancements in sports complexes to create a dynamic and forward-thinking facility that caters to the evolving needs of athletes and fosters a vibrant sports culture.

We learnt about time management, importance of the team work. We learnt how to think differently out of the box to create new things through our imagination.

Gayatri Dandgal



I am absolutely thrilled with the engineering exploration Course. It has been an incredible learning experience that has allowed us to gain practical knowledge in utilizing a wide range engineering of components box diverse projects. This course is highly engaging, providing both valuable information and experience that has significantly deepened my understanding of the practical applications of engineering.

Sanika Patil



We feel it was very good platform to learn about engineering course.

We learnt many things which we were not aware of. We learnt about teamwork, hard work and ethics.

Rohan Kulkarni



Stair Lift

Mentor : **Prof. Shreyas Walvekar**

Need Statement : **A civil contractor wants to facilitate the vertical/inclined means of transportation inside the residential building for physically challenged and old age people.**

Abstract : This project represents a proposal to introduce inclined/vertical means of transportation within residential buildings, aimed at improving mobility and accessibility for physically challenged and elderly individuals. Recognizing the challenges faced by these individuals in navigating multi-level structures, this initiative seeks to create an inclusive environment that promotes independent living and enhances the overall quality of life. The proposed solution entails the installation of inclined/vertical transportation systems, such as inclined lifts or ramps, strategically positioned throughout the residential building. These inclined mechanisms would provide a safe and efficient mode of transportation, enabling individuals with physical limitations to move seamlessly between different floors and areas of the building. Stair Lift consists of a motorized chair or a platform that moves along with a rail system mounted on/beside the staircase. Stair lifts are typically used by the people who have difficulty in climbing stairs due to age, disability, injury, or other physical limitations. By implementing inclined means of transportation within residential buildings, this project endeavours to foster inclusivity and optimize the living experience for physically challenged and elderly individuals. It has the potential to create a supportive and accessible environment that enables these individuals to lead independent and fulfilling lives within their residential communities.



Engineering exploration is a good student personality development course. It helps the students to discover new things. Think beyond their limits and make things beyond imagination. It changes your perspective and makes us creative. It taught us engineering ethics and morals.

Regina Albert Fernandes



Engineering Exploration taught me many valuable things such as how to analyse a problem and give the appropriate solution. It also taught us multi-disciplinary skills and ethics.

Shreya Arun Miskin



The Engineering Exploration Course provided a dynamic and engaging learning experience, broadening my understanding of various engineering disciplines.

Wilfred Antonio Albert Borges

Semi-Automatic chocolates dispensing machine

Mentor : **Prof. Sachidananda T. G.**

Need Statement : **A Stationary shop owner needs a semi-automatic chocolate dispensing machine which is portable.**

Abstract : The semi-automatic chocolates dispensing machine combines the use of a servo motor,

an ultrasonic sensor, and a rack and pinion mechanism to create a reliable and efficient candy dispenser. The main objective of this project is to develop a machine that can dispense chocolates semi-automatically, reducing the need for manual intervention. The servo motor acts as the driving force in the system, providing controlled and precise movement to the dispenser mechanism. The IR sensor is utilized to detect the presence of a coin inserted by the user and triggers the dispensing process. The rack and pinion mechanism is employed to convert the rotational motion of the servo motor into linear motion, allowing for the controlled release of chocolates. The rotation of the servo motor drives the pinion gear, which engages with the rack, causing it to move in a linear direction. As the rack moves, it pushes the chocolates forward, facilitating their dispensing into a tray or container. The implementation of this semi-automatic chocolates dispensing machine offers several advantages, including improved hygiene, convenience, and accuracy. By minimizing manual contact, the risk of contamination is reduced, making it an ideal solution for environments such as offices, schools, and public spaces. Furthermore, the precise control of the servo motor ensures consistent chocolates dispensing, preventing wastage or dispensing errors. In conclusion, the semiautomatic chocolates dispensing machine integrates servo motor technology, IR sensors, and a rack and pinion mechanism to create an efficient and reliable chocolates dispenser. This project not only showcases the application of engineering principles but also addresses the need for automation and convenience in everyday tasks. The machine's ability to provide hygienic, accurate, and effortless chocolates dispensing makes it an innovative solution for various settings.



Engineering Exploration is a very creative subject it makes the students more creative and enables to explore the very branches in the engineering.

Aishwarya S. Metri



This subject has helped us to understand how important the team work is. And helps to build the different skills.

Nandeesh Katakol

Exploration has developed many technical skills in me and has given many information about modern technology.

Shreya V. Kadakol

CHALK DISPENSING MACHINE

Mentor : **Prof. Kunjan Shinde**

Need Statement : **KLE Technological University requires a system to dispense chalk.**

Abstract : The chalk dispensing machine is an innovative solution designed to streamline and automate the distribution of chalk in classrooms of educational institutions. This project aims to address the challenges faced by teachers and institutes in manually handling and distributing chinks and provide an efficient and user-friendly alternative. The machine utilizes a storage container for holding a large number of chalk sticks, ensuring an ample supply is readily available. A motorized mechanism is employed to dispense chalk sticks in a controlled manner, eliminating the need for manual distribution. The automated nature of the machine frees up valuable time for teachers, enabling smooth transactions in teaching rather than engaging in related manual tasks.



The past few days have been very interesting to work with my teammates, we got to learn so many things related to mechanisms and new apps. We had good experience with working our mentor

Khushi R. Gadad

Exploration is a very board subject which involves different fields and helps us explore about new things. I had great time working on the model and learn new stuffs.

Prem A. Vhankhande

We got learn and see new stuffs in thinking lab. I got to work with my teammates and mentor on a very interesting project. It was new and fun.

Sanjana S. Biradar

GRAIN FILTERING MACHINE

Mentor : **Prof. TUSHAR BIRJE**

Need Statement : **AN NGO needs grain filtering system for food processing.**

Abstract : The aim of this project is to design and develop a grain filtering machine that enhances the efficiency and quality of grain filtering processes. The machine offers an automated and precise method for sorting and filtering grains, thereby enhancing productivity, reducing labor-intensive manual sorting, and ensuring the delivery of high-quality grains to the market. The grain filtering machine integrates advanced sensor technologies and robotics, enabling it to efficiently segregate grains based on various criteria such as size, weight, shape, and color. The machine can accurately identify and separate defective, immature, or otherwise undesirable grains, ensuring a consistent output of premium quality grains. Furthermore, the machine incorporates a user-friendly interface that allows operators to effortlessly set filtration parameters, monitor processing efficiency, and adjust settings in real-time. This feature offers flexibility and customization to cater to the specific requirements of different grains, facilitating optimal filtration and minimizing wastage. In addition to enhancing quality control, the proposed grain filtering machine offers notable economic benefits. With streamlined operations, reduced reliance on manual labor, and improved efficiency, it increases overall production throughput while significantly minimizing processing costs. The machine's design prioritizes durability, ease of maintenance, and energy efficiency, resulting in a sustainable and economically viable solution for agricultural, processing industries and household use. In conclusion, the development of this grain filtering machine will offer a significant advancement in the grain processing industry, promoting improved efficiency, quality control, and operational convenience. The project will contribute to the automation and modernization of grain filtering processes, benefiting both small-scale and large scale grain processor.



Engineering Exploration taught us many skills. Moreover to think creatively. It taught us to question and establish ways of doing things and to come up with new ideas. It helps us to think logically and solve problems.

Pruthviraj Nesirakar



Engineering Exploration was a great journey. We got a great opportunity to learn new things apart from studying e also learnt about time management, how to work in team, cooperating with team members etc.

Daneshwari Shahapur



Attending Engineering Exploration classes was of great benefit for us. We were able to learn many new things and gain a lot of knowledge. We learnt about circuit connections, data analysis, different kinds of motors and linkers etc.

Diya Revankar

Smart Storage

Mentor : **Prof. Shishir Patil**

Need Statement : **A Dharwad High Court Advocate is in a need of Portable bin which can segregate files and documents so that he can preserve them safely.**

Abstract : The Smart Portable Locker System is a student-centered project aimed at revolutionizing the traditional locker experience by incorporating advanced technology to provide enhanced security and convenience. The project addresses the limitations of conventional lockers by leveraging smart features such as biometric authentication, IoT connectivity, and intelligent monitoring. The main objective of the Smart Portable Locker System is to ensure the safety of students' belongings while offering a user-friendly and efficient storage solution. By implementing biometric authentication methods, such as fingerprint or facial recognition, the system eliminates the need for physical keys or combinations, reducing the risk of unauthorized access. Furthermore, the integration of IoT capabilities enables seamless connectivity between the lockers and a centralized management system. Students can access and manage their lockers remotely through a dedicated mobile application, allowing them to reserve lockers, check locker availability, and receive notifications regarding locker usage. To enhance security, the system utilizes intelligent monitoring features, such as motion sensors and CCTV cameras. These components detect any suspicious activity within the locker vicinity and trigger alerts in real-time to relevant authorities or campus security personnel. The Smart Portable Locker System also focuses on optimizing locker utilization and resource allocation. Through data analytics and machine learning algorithms, the system can analyze locker usage patterns and identify areas of improvement. This information can assist educational institutions in effectively managing locker availability and implementing strategies to meet student demand. In conclusion, the Smart Portable Locker System offers a comprehensive solution that enhances security, convenience, and efficiency for students. By leveraging advanced technologies, it addresses the limitations of traditional lockers, revolutionizing the student storage experience and contributing to a safer and more streamlined educational environment.



Very interesting case studies as well which made for interesting class discussions. The lecturer's teaching is well organized and presented, which helped me to accept the new knowledge quickly. I am happy with the content of the course, like the case-based approach.

Pallavi Lad



Engineering exploration is beautiful learning process which allows us to explore the engineering world. It is not just about technology it is the process in which we can acquire the knowledge about problem solving strategies, practical executions and utilize these to serve the society in various aspects. As well as this process never forget to remind us about the engineering ethics and values. In this way we enjoyed this learning cum exploring process.

Vaishnavi Sanjay Kadolkar



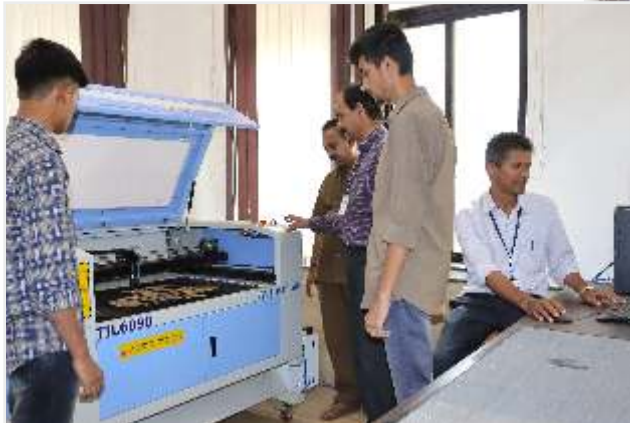
The course engineering exploration teaches us the Multi-disciplinary skills, Ethics and Data Acquisition Analysis. This course is co-designed and co-taught by faculty members drawn from multiple engineering disciplines it follows Project Based Learning

Radhesh Patil



The Supporting staffs helped us to get the shape of our virtual model to reality. They were very kind and excited while teaching us to run the machineries during Thinking Lab sessions.

Prasad



The supporting staffs were like co-mentors for our students. They were found co-operative and helpful during all the sessions of Engineering Exploration for both students and teaching staffs.

Prof. S. B. Kulkarni

Unseen Hands of Exploration

As Engineering Exploration enters its First year of delivery, its also time to show our gratitude to our support staff for their relentless contribution to support student learning in the Engineering Exploration Learning Studio and Thinking Lab. From readying the mechatronic learning kits in the studio to helping students operate the tools and equipments in the Thinking Lab, the support staff have been the spine of this course.

We thank them for their enthusiastic perseverance in contributing to successful student learning.



KLE

TECHNOLOGICAL UNIVERSITY

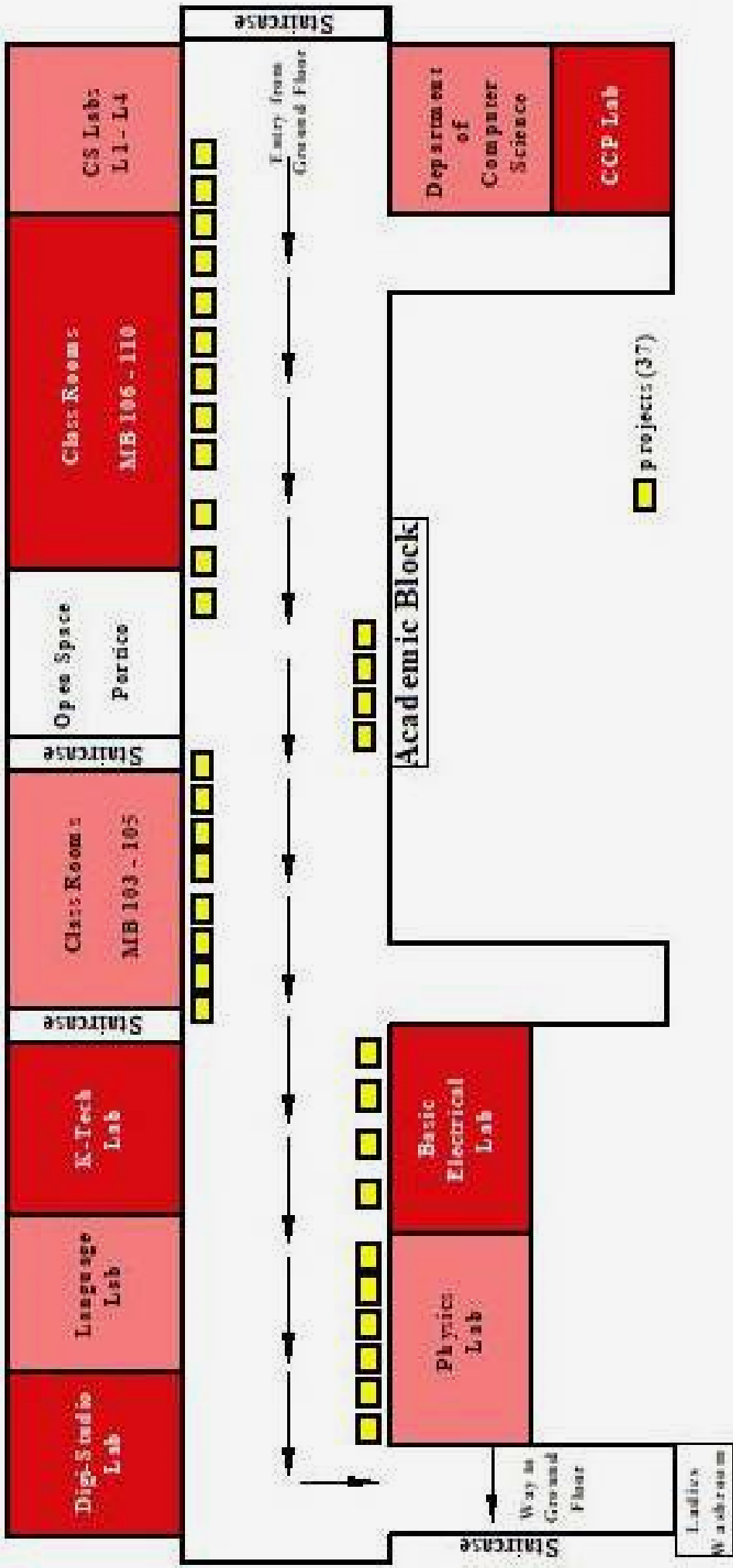
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PRAYOG

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EXHIBITION LAYOUT - FIRST FLOOR





KLE

TECHNOLOGICAL UNIVERSITY

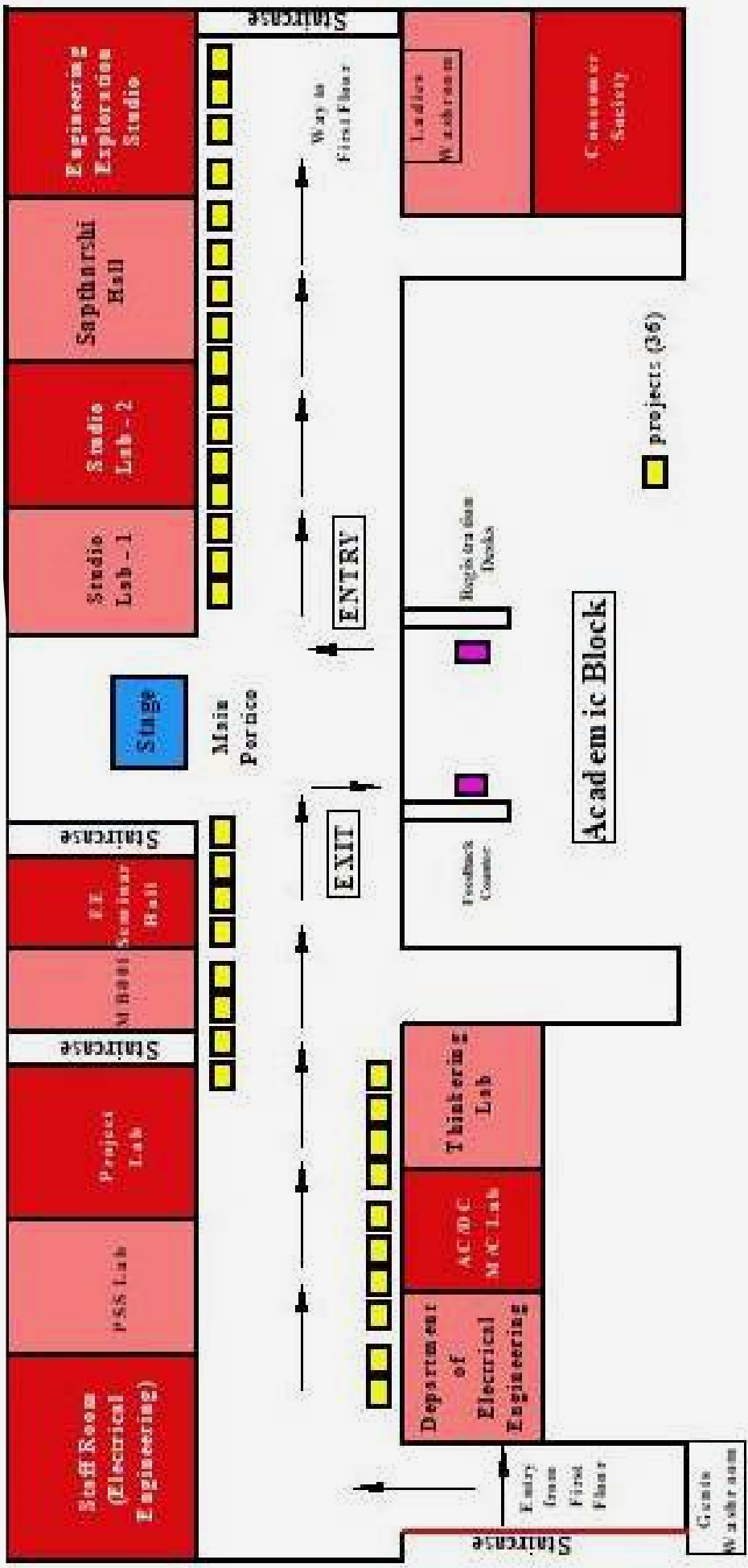
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EXHIBITION LAYOUT - GROUND FLOOR





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