Vision

To become a premier fabrication center that empowers students to design and create innovative engineering projects that contribute to the advancement of technology and society.

Mission

Our mission is to provide a state-of-the-art fabrication center that offers students the resources and guidance needed to turn their ideas into reality. We strive to foster a culture of creativity and innovation by providing access to cutting-edge technologies, tools, and equipment. Our goal is to inspire and empower students to develop practical solutions to real-world problems through hands-on learning and experimentation. We are committed to providing a safe and collaborative environment that encourages interdisciplinary collaboration and lifelong learning.

Name	**Designation**	**Department**	**Role**
Dr. J P Sharma	Associate Professor	ME, SOE	Fabrication centre Coordinator

Studnet Team

Sr. No.	**Name of the students**	**Roll No.**	**Roles**
1.	Rajveer Singh Bedi	2K19MEUN03018	Fabrication
2.	Mohit Sanju	2K19MEUN03012	Fabrication
3.	Vikas Kushwaha	2K19MEUN03022	Manufacturing
4.	Pritam Das	2K19MEUN03015	Design & simulation
5.	Sudhir Parida	2K19MEUN03020	Manufacturing

SOPs for Fabrication centre

Purpose of this Standard Operating Procedure Document is to ensure that the activities of Institution Innovation Council (IIC) of Manav Rachna University (MRU) (established in 2018), are executed in accordance with the guidelines specified by Ministry of Education (MoE) Innovation Cell (IC) of Government of India, so as to attain the desired outcome of fostering the innovation culture in the university campus.

1. The Fabrication centre is open to all students, faculty members, and research scholars of Manav Rachna University. The centre promotes and facilitates Trainings, Workshop, innovative projects in thrust areas Product Development Unit related to engineering domain.

2. The Key domain areas are design, fabrication and convert idea into product
3. The student coordinators are responsible for promoting the Vision and Mission of the Fabrication center.
4. Coordinator constitutes the student coordinator team depending on the student's performance and interest levels will be constituted every year. Roles and responsibilities are defined and assigned to Student coordinators.
5. For each quarter, an activity calendar is prepared by the Coordinator. Student coordinators are given the responsibility for organizing the activities.
6. At the end of the academic year, the Coordinator prepares and submits an Annual Report of various Activities and achievements to the Director of Innovation and Incubation, Dean Research, Registrar and Vice Chancellor of University as per the prescribed template.

Achievements

Team Excels at Aravalli Terrain Vehicle Championship 2023

Under the leadership of Mr. Mohit Sanju and Mr. Rajveer Singh Bedi, a team of nine university students from MRU-IIC excelled in the Aravalli Terrain Vehicle Championship (ATVC) from March 1 to 5. The university generously financed the project with Rs. 5,70,000, and the team, guided by Dr. J P Sharma and Dr. Prashant Bhardwaj, showcased innovation in designing and manufacturing a durable off-road vehicle for challenging terrains. Utilizing advanced CAD/CAM software, they designed a lightweight yet powerful vehicle with excellent ground clearance, conducting rigorous tests to ensure optimal performance. Competing against teams from various universities, they secured ninth place in the national-level competition organized by Nutan Maharashtra Institute of Engineering and Technology, Talegoan, and Orison Education India Ltd. The event, promoting Skill India, Startup India, Go Green, and Make In India, attracted over 100 teams and 3500 participants, celebrating engineering innovation and skills.

Trainings/Workshops/Seminars

Workshop on “Design Validation through ANSYS”

The workshop on Design Validation through Ansys, conducted on February 5th, 2024, by Mr. Amaan Khan and Mr. Satyam as the speakers. The speaker for the session are student volunteer to setup a mark for mentee-mentee teaching.The workshop spanned from 9 am to 3 pm and was tailored to engineering students keen on enhancing their understanding of design validation processes.

The session commenced with an exploration of CAD modeling, where attendees learned the intricacies of importing problems into the software. Following this, emphasis was placed on meshing techniques, essential for refining models for accurate simulations. Participants were guided through the application of boundary conditions, a critical step in ensuring simulations mirror real-world scenarios.

Moreover, the workshop delved into result visualization, enabling students to interpret and analyze outcomes effectively. The significance of validation in the design process was underscored throughout the session, elucidating its pivotal role in ensuring the reliability and efficacy of engineering solutions.


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Workshop on “Structural and CFD Simulation through ANSYS”

The workshop on Structural and CFD Simulation through Ansys, conducted by esteemed speakers Dr. Joginder Singh and Dr. J P Sharma, took place on February 3rd, 2024, from 9:00 am to 3:00 pm. The session aimed to provide valuable insights and hands-on experience in the pre and post-processing stages of problem setup, including geometry import, meshing, boundary conditions, and result visualization.

The session delved into practical aspects, offering hands-on experience to the attending faculty members. Participants were guided through the intricate process of problem setup, covering key elements such as geometry import, meshing techniques, application of boundary conditions, and effective result visualization. This interactive approach allowed faculty members to actively engage with the software, enhancing their understanding of the simulation process.

The workshop saw active participation from faculty members, creating an environment conducive to collaborative learning. Dr. Joginder Singh and Dr. J P Sharma fielded questions, provided clarifications, and shared real-world examples to enrich the learning experience. The diverse

backgrounds of the participants, ranging from various engineering disciplines, added depth to the discussions.

Workshop Report: Industry 4.0 by SAE Society of MRU

The Society of Automotive Engineers (SAE) in collaboration with IIC and ME department at MRU organized a workshop on Industry 4.0, a revolutionary concept encompassing the integration of advanced technologies to enhance automation in various industries. The workshop aimed to impart knowledge on the practical implementation of automation through the use of relays, Arduino, Raspberry Pi, and robotic arms, with a focus on communication using Python programming.

The workshop was conducted by Mr. Manaj Yadav, a distinguished expert from SVR Infotech, Pune. Mr. Yadav brought a wealth of experience and practical insights into the application of Industry 4.0 technologies. His expertise in automation, relay systems, Arduino programming, Raspberry Pi applications, and robotic arm control through Python programming made him an ideal resource person for this workshop.


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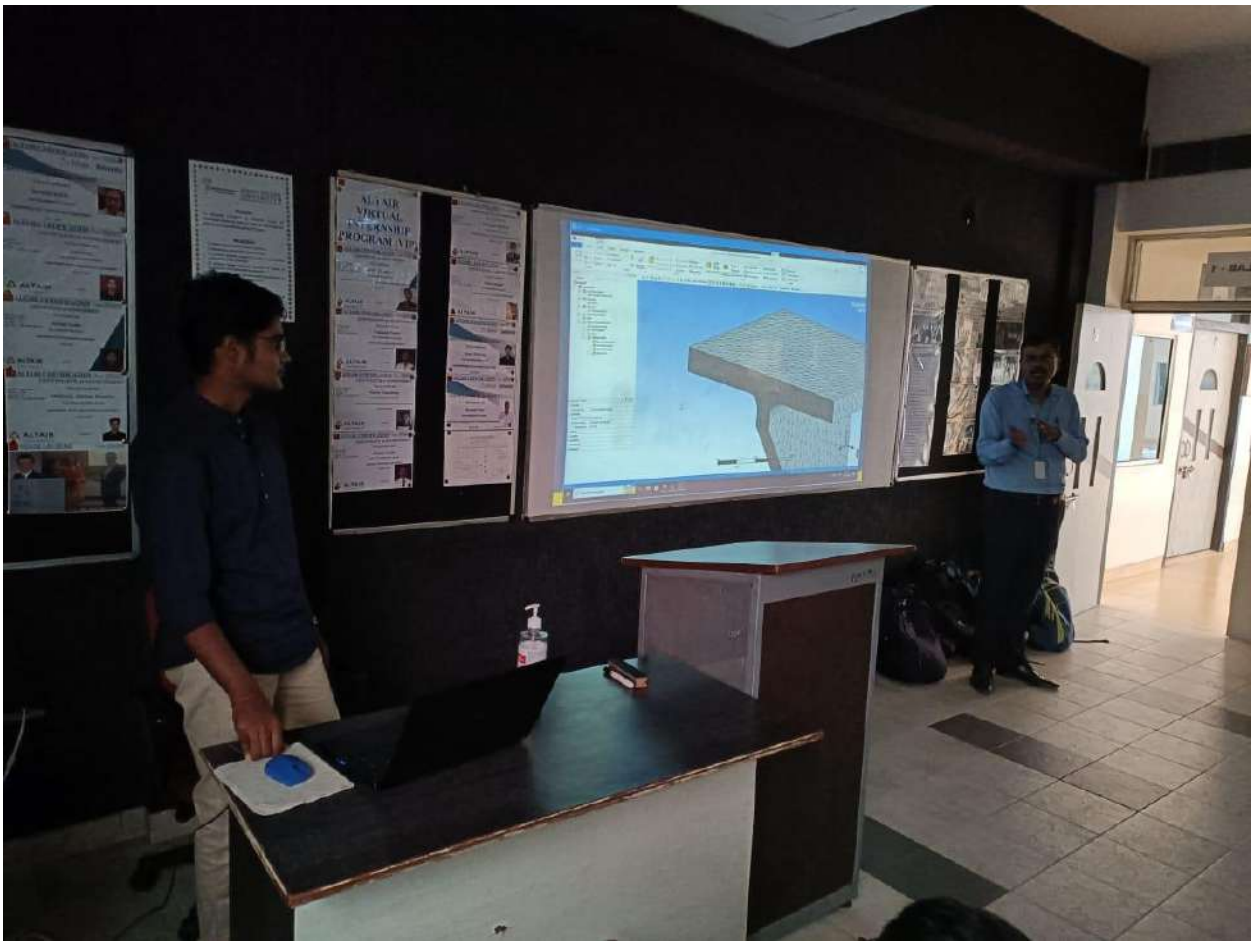
Workshop on Design Simulations

SAE-MRU in collaboration with the Mechanical Engineering Department conducted a "workshop on Design Simulation" on 12th Oct. 2022. The speaker for the workshop was Mr. Pritam Das, a Final year student-ME. The objective of the workshop is to generate curiosity regarding how design and simulation help engineers in the real world. During the workshop, the benefits of using simulation software for the design of structural components and its optimization tool for minimizing the quantity of material while keeping the strength of material for specific applications were shared with the participants.



Workshop on ATV Design and Fabrication

Workshop on the design and fabrication of All-Terrain Vehicles (ATV) at the Dr. O P Bhalla Innovation and Incubation Center on October 31, 2023. The event aimed to equip participants with the necessary skills and knowledge required for the development of ATVs, specifically for SAE mBAJA and ATVC competitions.

Mr. Karan Khanduja, alumni of 2023 batch with their team mates offer insight to the workshop with the ATV fabricated to compete in the mBAJA 2023.The workshop covered various crucial aspects for the design and fabrication of ATV such as Design Principles. The importance of adhering to engineering principles in the conceptualization and design phase, ensuring safety, efficiency, and compliance with competition regulations. Fabrication Techniques need to be in consideration for fabrication process, materials selection, and manufacturing techniques essential for building a robust and high-performance. For testing and validation, Insights into the testing procedures required to validate the performance and safety of the vehicle, with a focus on meeting competition standards.

Emphasis on effective teamwork and communication within the design and fabrication teams, recognizing the significance of collaborative efforts in achieving success. Always adhere with competition Guidelines that offer Guidance on understanding and meeting the specific criteria outlined by SAE for mBAJA and ATVC competitions, ensuring participants are well-prepared for the challenges they might encounter, otherwise wise teams may not participate if they haven't met the predefined objectives.

Workshop on Industry 4.0

Workshop on Industry 4.0 was organized at MRU in NF 01 on 27th Oct. 2023. It is a revolutionary concept encompassing the integration of advanced technologies to enhance automation in various industries. It aimed to impart knowledge on the practical implementation of automation through the use of relays, Arduino, Raspberry Pi, and robotic arms, with a focus on communication using Python programming.

Mr. Manaj Yadav, a distinguished expert from SVR Infotech, Pune gave his practical insights into the application of Industry 4.0 technologies. His expertise in automation, relay systems, Arduino programming, Raspberry Pi applications, and robotic arm control through Python programming made him an ideal resource person for this workshop.

The workshop covered a wide range of topics such as Introduction to Industry 4.0 through which students have basics of Automation through which they Explore the role of relays in automation and their application in various industries. Through the use of Arduino and Raspberry Pi which can be integrated via Arduino and python programming for automation purposes. An in-depth look

into Python programming for effective communication between automated systems through Robotic Arm Control.

The Industry 4.0 workshop conducted by the SAE Society of MRU, featuring Mr. Manaj Yadav from SVR Infotech, Pune, was a resounding success. Participants gained valuable insights into the practical applications of automation technologies, equipping them with the knowledge and skills needed for the evolving landscape of Industry 4.0.

Workshop on Design Simulations

A "workshop on Design Simulation" was conducted by Mr. Pritam Das, a Final year student-ME on 12th Oct. 2022. The objective of the workshop is to generate curiosity regarding how design and simulation help engineers in the real world. During the workshop, the benefits of using simulation software for the design of structural components and its optimization tool for minimizing the quantity of material while keeping the strength of material for specific applications were shared with the participants.
The details of the workshop are as follows:

- Importing of geometry to Ansys Design modeler
- How does meshing affect the results and criteria for the selection of the correct meshing type?
- applying load and support to the geometry
- Display of results stress and deformation
- Buckling of the bracket and transfer of data from static structure module to bucking module.

At last, different modules of Simulation software were also shared with the participants.

5 Days Workshop on Robotics

A workshop on robotics prototyping was held from April 1st to April 7th, 2022. The program, which was led by Mr. J P Sharma, covered an introduction to robotics and included software called Roboanalyzer for validation. Assistant Professor Vijay Gill demonstrated L298D and L293D integrated circuits (ICs) to teach servo micromotors and DC motors. The coding was done with the Arduino IDE followed by A simulation of an Arduino-coded servo, which marked the end of the workshop. In addition to discussing line follower robots and their parts, Mr Aditya from SVR Infotech in Pune led a practical experimentation session. Mr. Aditya answered questions, and Dr. Sujata Nayak was thanked as the session concluded.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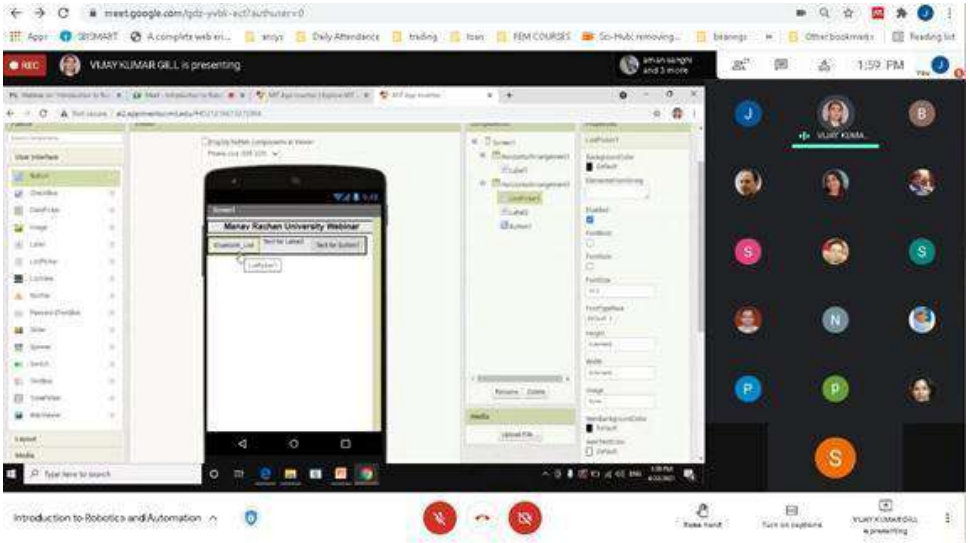
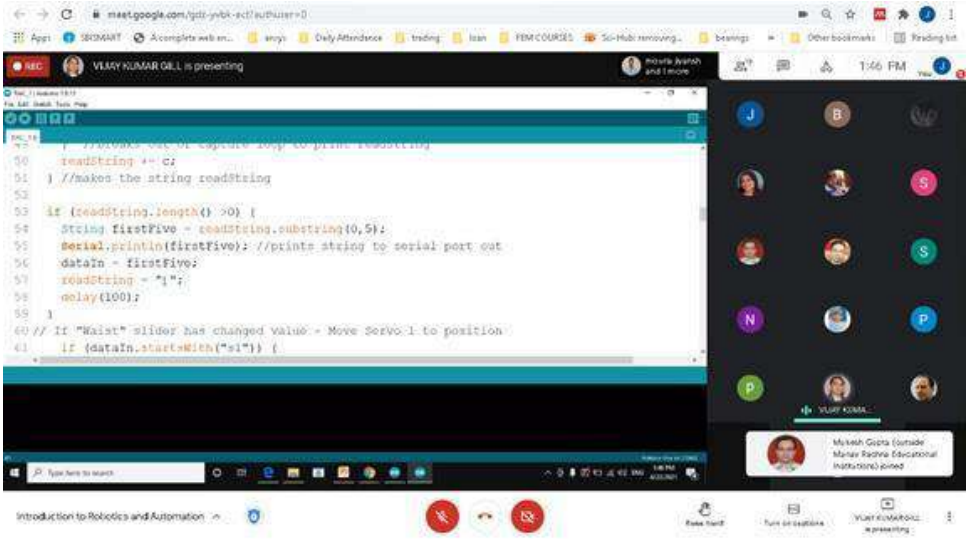
Webinar on "Introduction to Robotics and Automation"

A webinar on "Introduction to Robotics and Automation" was organized on April 22, 2021, focusing on topics such as the history of robotics, applications in the automotive industry, robot configurations, joint types, artificial intelligence, vision systems, mathematics, and validation using Roboanalyser's kinematics. Automation aspects, including electronic circuits, Bluetooth wireless control, servo control with Arduino software, and MIT software for designing applications for articulated robots, were discussed by Mr. Vijay Gill, Assistant Professor of ECE. The Vice-Chancellor, Dr. I K Bhatt, concluded the session with a motivational speech, emphasizing the need for more workshops and cross-disciplinary collaboration to address societal issues.





Workshop report on assembly and disassembly of 4-cylinder diesel engine

On March 3, 2020, a workshop was held with an emphasis on the disassembly and assembly of 4-cylinder diesel engines. The goal of the workshop, which was hosted by the SAE Society at Manav Rachna University, was to improve the participants' aptitude for maintaining diesel engines. Practical demonstrations, hands-on activities, and theoretical discussions of engine components were all included in the session. Troubleshooting techniques, safety precautions, and necessary tools were presented to the participants. As the workshop came to an end, certificates were given out and attendees gave encouraging comments about their increased comprehension, practical experience, and troubleshooting abilities. Owing to its success, it is advised that participants attend periodic sessions to stay informed about the most recent advancements in diesel engine technology. The workshop greatly improved the technical proficiency of the participants and their ability to maintain diesel engines effectively overall.

Workshop on introduction to 4-stroke 4-cylinder diesel engine and 2-stroke engine.

Manav Rachna University's SAE Society hosted a workshop on February 13, 2020, focusing on the disassembly and assembly of 4-cylinder diesel engines. Aimed at improving participants' understanding of diesel engine maintenance, the event included practical demonstrations, theoretical discussions, and hands-on activities covering engine components, essential tools, safety precautions, and troubleshooting methods. Certificates were awarded, and participants provided positive feedback on increased comprehension and practical experience. The workshop's success encourages ongoing participation for staying updated on diesel engine technology advancements. The session also covered two-stroke engine details and concluded with a discussion on engine types and maintenance advice, contributing significantly to participants' technical proficiency in diesel engine maintenance.

Workshop on Introduction to 3D Modeling & Simulation on Ansys

On April 22, 2019, the SAE society organized a workshop titled "Introduction to 3D Modelling & Simulation on Ansys" at KF 01, featuring Mr. J P Sharma, a distinguished SAE member, as the resource person. The workshop, attended by 25 students and one faculty member, aimed to educate participants on the significance of 3D modelling software, particularly in part or assembly modelling. Emphasizing the role of simulation software in expediting design concept validation, the event addressed the dynamic requirements of the competitive automobile industry. Through hands-on activities, participants gained practical insights into the features and constraints of Ansys simulation software and 3D modelling capabilities. The workshop not only provided valuable knowledge on the applications of 3D modelling and simulation in the automotive sector but also fostered a collaborative learning environment.

Workshop on Introduction to IC Engine

A workshop entitled "Introduction to IC Engine" was arranged to commemorate the birthday of **Dr. Abdul Kalam**, and it was attended by both faculty and students. The workshop offered a perceptive examination of the principles underlying the operation of different internal combustion engines, clarifying the locations of engine assembly components and their corresponding functions. Participants were allowed to dive deeper into the complexities of IC engines through a hands-on practice session designed to improve understanding. Four faculty members from various departments were present, and about twenty-five students participated actively in this activity. This workshop promoted a comprehensive understanding of internal combustion engine dynamics among participants while also paying homage to Dr. Abdul Kalam.

Workshop on Introduction to Biofuels

On October 11, 2018, a workshop titled "Introduction to Biofuels" took place at HF 03, featuring Dr. Vinayak Vandan Pathak as the resource person. Attended by 11 students and 1 faculty member, the workshop aimed to raise awareness about innovative fuel-blending approaches in the petroleum industry. Dr. Pathak, an expert from the chemistry department, delivered a comprehensive lecture on crude oil extraction, distillation processes, and the diverse products obtained. The session highlighted the industry's exploration of alternative compositions to supplement or replace petroleum products, considering the finite nature of crude oil extraction. The workshop concluded with an interactive segment, addressing student queries and deepening their understanding of the evolving landscape of biofuels. It not only expanded participants' perspectives on alternative energy sources but also heightened awareness of the importance of sustainable solutions in fuel production.

Workshop on Delcam and Mastercam

A workshop was organized on Delcam and Mastercam on 27 October 2018 in M Block. The objective of the workshop is to give introductory knowledge about the automated machining operation that can be performed on VMC through this software. Mr. Josh was the speaker for the workshop and shared his vast experience of how such automated facilities help us in prototyping and give a clear view of the physical appearance of the part or component.

The session starts with the basics of manufacturing operations that can be performed on VMC. The session proceeded with a physical exposure with the software that how we can import geometry and then its placement as per the requirement. The session ended with hands-on on the VMC with questions asked by the students. The session was very informative in terms of how automation takes place in Manufacturing operations in industries.

Workshop on "assembly and disassembly petrol and diesel engine"

The SAE society organized a 1-day workshop on "assembly and disassembly petrol and diesel engine" on 20th Sept 2018. The workshop was coordinated by Mr. J P Sharma with 2 volunteers from the SAE society. A total of 22 students registered for the workshop and enthusiastically attended the workshop. Also, some of the faculties took an active part in the workshop. The objective of the workshop is to provide Practical knowledge about automobile engines with Develop engine dismantling and assembly skills.

Students took great participated in Hands-on with the engines during which student queries were also cleared.

Workshop on "Introduction to Euro Norms"

A workshop was organized by SAE on "Introduction to Euro Norms" on 13th Sept. 2018 for the students to provide awareness about the side effects of increasing pollution through automobiles, How such an increase in pollution increases global warming etc. During the workshop, all the pollutants that come out after the combustion of fuel in the Internal Combustion engine were explained to them. Also, what are the different technologies available in the market that help reduce the pollutants coming out from the exhaust such as catalytic converters, etc? Mr. Abhinav and Mr. Abdul are the two volunteers who explained all the above-mentioned topics to the students. In this workshop, almost 23 students attended this workshop.