

DEPARTMENT OF
MECHANICAL AND AEROSPACE ENGINEERING
IIT HYDERABAD

INDUSTRY CONNECT REPORT

 भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad



2024

www.mae.iith.ac.in

MAE, IIT Hyderabad

WELCOME TO INDUSTRY CONNECT REPORT 2024



**Coming together
is a beginning;
keeping together
is progress;
working together
is success.**

Henry Ford

Dr Ashok Kumar Pandey

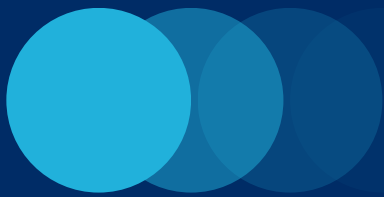
Head of Department

We warmly welcome you to Industry Connect, an event dedicated to strengthening the vital collaboration between academia and industry. This platform fosters innovation, knowledge sharing, and partnerships that drive technological advancements, real-world impact, and long-term mutual growth opportunities.

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MAE Industry Connect Report 2024

Inauguration



Dr. B. S. Murty

Director
IIT Hyderabad

Chief Guest

Dr. V. K. Saraswat

Member NITI Aayog,
Former Secretary, Dept. of Defence RND
Scientific Advisor to Defence Minister

Dr. Ashok Kumar Pandey

Head, Department of MAE
IIT Hyderabad



Inauguration Session

The session commenced with an introduction by **Dr. Nirajan Ghaisas**, who welcomed the attendees and outlined the purpose of the event—fostering a strong connection between academia and industry. Following this, the **Head of Department (HOD)** delivered a brief about the MAE department's work on various Centers of Excellence (COEs) and ongoing research initiatives. He also introduced the **IITH Director**.

Introduction of Dr. Saraswat



Introduction of Dr. Saraswat

Prof. Ashok introduced **Dr. V.K. Saraswat**, emphasizing his role as a **distinguished faculty** in the MAE department at IITH and his significant contributions in **securing substantial funding** for the department. Prof. Ashok also highlighted Dr. Saraswat's illustrious background, including his position as a **NITI Aayog member** and his extensive experience in defense research.



Dr. Saraswat's Address:

In his address, **Dr. Saraswat** shared his insights on the importance of industry-academia collaboration and the key focus areas for India's growth in research and development.



- Recounted his early experiences in **Hyderabad in 1972**, where he struggled to find local industries capable of supporting **DRDO** with equipment repairs, underlining the need for **better integration between industry, academia, and laboratories**.
- Stressed the importance of **research parks**, highlighting the success of **IIT Madras Research Park** as an example of how collaboration with industry can bring significant benefits to academic institutions, including **funding opportunities** and access to public funds.
- Discussed **Technology Readiness Levels (TRLs)**, explaining how academia typically works at TRL-3/4 and how industry involvement is necessary to scale up to TRL-7/8 for commercialization.



- Addressed the **funding risks** industries perceive in collaborations with academia and emphasized the need for standardized procedures to build trust and communication.
- Highlighted the **US model** of R&D funding, where **70%** comes from federal government sources and **30%** from industry, suggesting that India can benefit from adopting a similar approach.
- Emphasized the necessity of creating a **value creation center** for scaling up systems and urged industries to take the lead after TRL - 3/4 to push products toward commercialization.
- Cited **Dr. A.P.J. Abdul Kalam's mission-mode research model** as an example of how focused research efforts can yield better outcomes than diffuse approaches.
- Encouraged industries to establish **research centers at IITs** to build a collaborative ecosystem that drives innovation and commercialization.
- Spoke about the importance of **technology transfer** and academia's role in **commercialization**, while pointing out that India currently relies on **98% foreign designs**, emphasizing the need to build indigenous design and product development capabilities.



Director's Address (Virtual)

Director's Address

Announced the relaxation of the mandatory 6-month residential stay requirement for PhD candidates employed in industry, allowing them to take the required 4 courses from other platforms (such as NPTEL), recognizing the challenges of extended absence from work.



During the Director's Address

Appreciated the MAE department for organizing the industry connect event and expressed hope that the department would gain substantial benefits from this initiative.

Suggested that other departments at IITH could take similar steps to strengthen ties with the industry.

Note: IITH Director could not attend the event in person due to prior commitments at NIT Andhra Pradesh, he joined virtually.

Shared a new initiative for B.Tech students: offering ₹1 lakh funding and a semester break to pursue innovative entrepreneurial ideas. Students who wish to continue their ventures may do so with the option to return within a 5-year window to complete their studies or, if they choose not to return, receive a diploma for their completed coursework.

MAE HoD's Message



Prof. Ashok Kumar Pandey, Head of the Mechanical and Aerospace Engineering Department, shared his vision for the department's future, emphasizing its commitment to excellence in research, innovation, and education. The department, known for its dynamic and diverse approach to engineering challenges, is structured around four key verticals: Integrated Design and Manufacturing, Thermo-Fluid Engineering, Mechanics and Design, and Aerospace Engineering.



Vote of Thanks



Concluding the session

The inauguration session concluded with **Prof. Ramji M** thanking the participants, faculty, staff, and industry representatives for their presence and support in making the event successful.





Organising Committee

Faculty Members	Staff members	Student Volunteers	
Prof. B. S. Murty, Director, Chief Patron	Srikanth Vootla	Salwa Iftekhhar	Deepthi K
Prof. Ashok Kumar Pandey, HoD, Patron	Munugala Dakaiah	Jayaprakash P	Mitali J
Prof. Ramji, Convenor	Raju Peta	Yashwanth	Vinayak M
Prof. Gangadharan, Co-Convenor	Ajith A	Sai Kishore	Anurag Yadav
Dr. Anirban Naskar	Darelli Pullarao	Sai Akhilesh	Subhasish
Dr. Niranjana	Dinesh Chakrapani	Vineeth	Mohan
Dr. Vishnu	Madhu Pandicheri	Naveen	Devender
Dr. Gopinath	Santhosh V	Rashmiranjan M	Kailas
Dr. Thulsiram	Srikanth Erry	Bhasker	Aman S
Dr. Neetu Tiwari	MadhuShankar Pillai	Tathagat Sarangi	Wilfred Arokia Geoffrey
Dr. Himabindu	Vikram Rekhala	Sai Krishna	Greeshma
Dr. Ankush Kumar Jaiswal	Jagadeesan	Raj Kiran Reddy	Ajmal
	Praveen Kumar	Anirudh	Deepachanthiran
		Swagatam	Cherishma M





List of Participating Industries

Name Of The Industry	Name Of The Participant
DYSL-SM	Mr. Niranjan Nagnath Ubale
	Mr. Santhosh
Mazagon Dock Shipbuilding Limited	Mr. Vishnu Dhaked
	Mr. Venkata Bharat B
DRDL, DRDO	Mr. Ganesan S
ASL, DRDO	Mr. K Srinivas
Advanced Engineering in Bosch Rexroth India	Mr. Vishnudas Ramaswamy
Tata Engineering and Locomotive Company	Mr. Murali Krishna Magham
INDIA 3DEXPERIENCE Edu Sales Director	Ms. Renuka Srinivasan
Ansys	Mr. Saurabh Patwardhan
GMR	Mr. Air Marshal Anantharaman
	Mr. Naveen Raja K
DMRL, DRDO	Dr. Sony Punnose
	Dr. Phani Mylavarapu
TPAC Phased array company	Mr. Sandeep Murjani
Arrobot	Mr. Ravi Achanta
BHEL RC Puram	Mr. Kamaldeep Gupta
	Mr. Ashok kumar mahankali
DIES	Mr. Venkateswarareddy
	Mr. Raffi Mohammed
Voith Turbo Private Limited	Mr. Raffi Mohammed
Sarmatrix Pvt Ltd	Mr. Amitabh
L&T, Precision Engineering Systems	Mr. M Nagi reddy
COLLINS AEROSPACE	Mr. Amrit Chatterjee
	Mr. Rajdeep Sawant
	Mr. Jnana Vamsi Kumar Basa
	Mr. Arjun Koustubhan
	Mr. Sambasiva Kodeti
	Mr. Deepak kokalla
	Mr. Umesh Singne
Mr. Subashish Mohapatra	



List of Participating Industries

Name Of The Industry	Name Of The Participant
RegalRexnord	Mr. Srikanth Ankireddy
	Mr. Umesh
ABB Hyderabad	Mr. Amit Bose (R&D Team Leader)
	Mr. Kiran Bhattar (R&D Team Leader)
	Mr. Harsha Srinivas (R&D HRBP)
ITW India Private Limited	Mr. Mithil Nayunigari
	Dr. Sasidhar
Vedasya Engineering Solutions Pvt. Ltd.	Mr. Shiva Goutham Pattapu
	Mr. Abhishek
Hyundai motors	Mr. Arvind V
	Mr. Nagarjuna
	Mr. Raviteja
	Mr. Ashok Kumar Reddy
	Mr. Mahesh
	Mr. Ramesh
Ansys Multi physics	Mr. Rama Wairagkar
VIAS3D India	Mr. Bhavesh Kumar
	Mr. Nagarajarao Talluri
DLRL, DRDO	Dr. M Gopal
Ultraviolette Automotive Private Limited	Mr. Krishnanand Venkatasubramanian
	Mr. Kolli Surya Teja
Oorja	Mr. Pradeep
Wabtec Corporation	Mr. Manoj Bhalerao
Converge CFD Software	Mr. Jameil Kolliyil
	Mr. Harshan Arumugam
NFC	Mr. Shiva Reddy
Toshiba Transmission & Distribution Systems (India) Pvt. Ltd	Mr. Jacob George
	Mr. Venkat Raju
	Mr. Manish Yadav
BorgWarner	Dr. P. Sridhar



List of Participating Industries

Name Of The Industry	Name Of The Participant
SAMSACT	Mr. M Krishna Mohan
	Mr. T.V.J Rao
	Mr. Kotya Naik
	Mr. V Girish Kumar
	Mr. Rajender Prasad
	Mr. Rajvadhan Rao
Sandvik Mining and Rock Technology India Private Limited (SMRTIPL)	Mr. Bala Sivakumar
	Mr. Girishkumar Gopakumar
	Mr. Aniruddha Kane
CPDC, ASL DRDO	Mr. Amith Gupta
L&T, Precision Engineering Systems	Mr. Anup Kadam
BHEL R&D	Mr. Manish Gupta
BHEL	Mr. Ramakrishna
	Mr. Raghavendra rao
	Mr. Satpal Reddy
DRDL, DRDO	Mr. Rajesh Kumar



Invitation Flyer



Department of Mechanical and Aerospace Engineering,
Indian Institute of Technology Hyderabad

Cordially invites you to

INDUSTRY CONNECT PROGRAM



LET'S TALK ABOUT INDUSTRY
ACADEMIA INTERACTION

Seminar | Panel Discussion | Interaction | Collaboration |
Networking

27th - 28th SEPTEMBER 2024

Convention Center, IIT Hyderabad

CONTACT :

+91 8328136210

office@mae.iith.ac.in

www.mae.iith.ac.in

SCAN ME



Program Itinerary (Industry and Department)

EVENT SCHEDULE

27
Sept

09:00-9:15

Registration

09:15-9:30

Introduction

09:30-10:15

**Academic
Curriculum**

10:30-11:15

**Inauguration
Ceremony**

10:30-10:35

Lamp Lighting Ceremony

10:35-10:40

Introduction to MAE-Industry
Connect (Prof. Niranjan Ghaisas)

10:40-10:45

Introduction to Department
(Prof. Ashok Kumar Pandey)

10:45-10:55

Address by Director
(Prof. B. S. Murty)

10:55-11:10

Address by the Chief Guest
(Dr. V. K. Saraswat)

11:10-11:15

Vote of Thanks (Prof. M. Ramji)

11:15-11:30

High-Tea

11:30-12:15

**Department and
its Research Vision**

12:15-13:00

**Thematic based
Breakout Session**

TPAC

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भारतीय प्रौद्योगिकी संस्थान बंबई

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Program Itinerary (Industry and Department)

EVENT SCHEDULE

27
Sept

13:00-14:00

Lunch Break

14:00-15:30

Lab Visits and Discussion

15:30-16:00

Poster Display

+ Tea Break

16:00-17:00

Feedback and Summary

17:00-18:00

Student Interaction Session

Industry Presentation (1 Slide/1 Min) and Interaction

High Tea Break

19:30

Dinner

Industry, Faculty, Staff and Students Volunteers

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Program Itinerary (Department)

EVENT SCHEDULE

28
Sept

10:00-11:30

Brainstorming
on academic curriculum

11:30-11:45

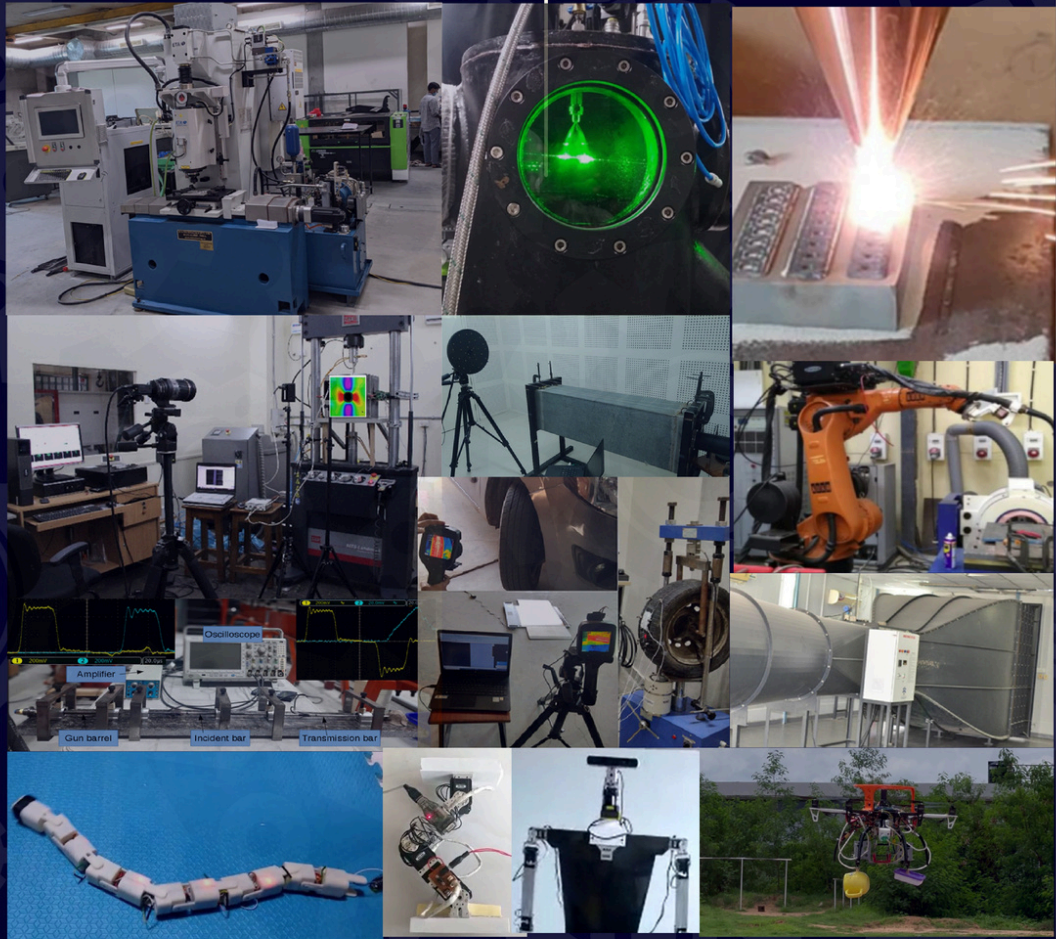
Tea break

11:45-13:00

Brainstorming
in research domains

13:00

Lunch



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భారతీయ ఇంజనీరింగ్ టెక్నాలజీ విశ్వవిద్యాలయం
ఆంధ్రప్రదేశ్ ప్రభుత్వం
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Session on Academic Curriculum



Attendees:

Dr. Harish & Dr. Syed
Industry Members
Faculty Members

Agenda:

Discussion on the current academic curriculum and feedback from industry experts for improvement and alignment with industry needs.

Overview of the Curriculum:

Dr. Harish gave a detailed overview of the current curriculum, highlighting upcoming changes for the academic year 2025. These changes are being formulated with inputs from students, alumni, the senate, and other stakeholders. He emphasized that as new faculty join, the range of specializations will continue to expand, making the system adaptable to changes. He also mentioned that if any industry expert is proficient in a specific subject, they are welcome to deliver courses to students in that area at IIT Hyderabad.

Questions and Suggestions from Industry Experts:

Intellectual Property (IP) Laws:

Concern: Industry is sensitive to IP laws, and a suggestion was made to make an IP law course mandatory.

Response: Dr. Harish mentioned that electives on IP and research ethics are available through LA/CA courses, and this feedback will be considered for future curriculum updates.

B.Tech Ideas and IP Protection:

Concern: There was a question regarding the protection of homegrown ideas from B.Tech projects.

Response: Faculty assured that proper mechanisms are in place to address IP concerns.

Courses on Noise, Vibration, and Signal Processing:

Concern: A request was made to include courses on noise and vibration and advanced signal processing.

Response: The faculty noted that students have the flexibility to take relevant courses from the Electrical Engineering (EE) basket.

Guidance on Elective Courses:

Concern: With a wide range of electives available, students may be overwhelmed and need guidance on course selections that align with specific career paths.

Response: Faculty mentioned that each batch has a faculty advisor to guide students in their course selections. Additionally, all faculty members provide general guidance, and the system can be reviewed to further enhance support in this area.

Sustainability Courses:

Concern: Sustainability is becoming critical in the industry, and more courses on the topic were requested.

Response: The faculty highlighted that ME5480 (Sustainability Engineering) is currently offered. Additionally, students interested in sustainability can take courses from the IITH master's program in sustainable engineering as part of their elective.

Engineering Drawing and Machine Drawing:

Concern: Clarification was sought on the inclusion of engineering drawing and machine drawing in the curriculum.

Response: Dr. Syed provided the necessary clarifications on this matter.

Characterization in Solid and Fluid Mechanics:

Concern: There was a request for courses dealing with characterization in solid mechanics and fluid mechanics.

Response: Faculty confirmed that characterization aspects are covered in existing solid and fluid mechanics courses.

Non-Destructive Testing (NDT):

Concern: Industry experts raised the need for courses on NDT and testing qualification.

Response: Faculty agreed to consider introducing courses related to NDT in future curriculum revisions.

Research Opportunities for 1st-Year Students:

Concern: A question was raised about allowing 1st-year students to engage in research projects.

Response: This suggestion will be discussed further, and the faculty agreed to explore structured ways to involve students in research from early years.

Industry Problems and Internships:

Concern: Industry problems need to be presented to students in a structured way, allowing interested students to work on them as part of their internships under faculty guidance.

Response: Faculty agreed on the importance of this approach and have mentioned we are working on this & will further take it up and deliberate on it.

Faculty Sabbaticals with Industry:

Concern: A suggestion was made for faculty members to take sabbaticals with industry to strengthen academia-industry collaboration.

Response: The faculty welcomed this suggestion, and the possibility will be explored further.



FEM and CFD in the 2nd Year:

Concern: There was a question about whether students in the 2nd year would be able to appreciate courses on Finite Element Methods (FEM) and Computational Fluid Dynamics (CFD).

Response: Dr. Syed provided clarity on the feasibility of these courses being introduced in the 2nd year.

Action Items:

- Consideration of making IP law courses mandatory.
- Review the process for guiding students on elective choices and career paths.
- Explore the introduction of NDT-related courses.
- Discussion on early research engagement for 1st-year students.
- Consideration of faculty-industry sabbatical opportunities.



Head's Research vision

Department of MAE

Prof. Ashok Kumar Pandey, Head of the Mechanical and Aerospace Engineering Department, shared his vision for the department's future, emphasizing its commitment to excellence in research, innovation, and education. The department, known for its dynamic and diverse approach to engineering challenges, is structured around four key verticals: Integrated Design and Manufacturing, Thermo-Fluid Engineering, Mechanics and Design, and Aerospace Engineering.

Integrated Design and Manufacturing:

The Integrated Design and Manufacturing vertical is at the forefront of developing advanced manufacturing techniques, pioneering design processes, and systems integration to optimize production. HoD emphasizes the growing significance of robotics, automation, and smart manufacturing in the future of industry. This vertical is aligned with the principles of Industry 4.0, where the integration of technologies such as digital twins, artificial intelligence (AI)-driven design, and smart factories is paramount.

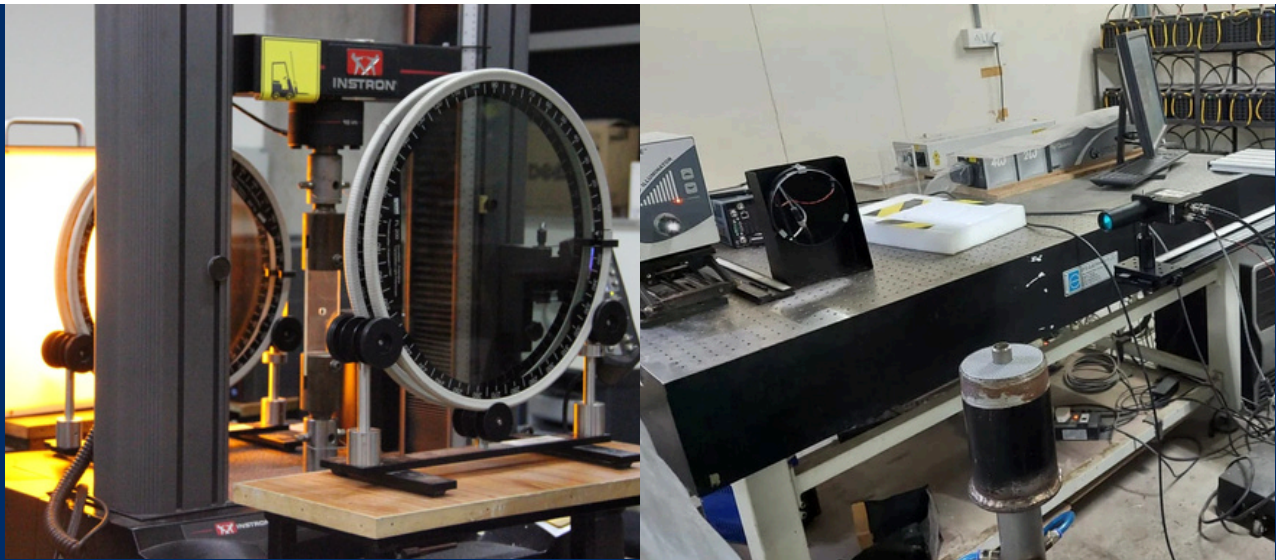
Under HoD's vision, students are equipped with the necessary skills to bridge the gap between conceptual design and real-world production, enabling them to lead in product innovation, sustainable manufacturing practices, and efficient production processes. The department aims to drive research in emerging fields like additive manufacturing, intelligent systems, and sustainable material development, shaping the future of global manufacturing.



Mechanics and Design:

The Mechanics and Design vertical is dedicated to fostering a deep understanding of material behavior, structural integrity, and dynamic systems. Prof. Ashok emphasizes the need for interdisciplinary approaches that blend traditional mechanics with cutting-edge research areas such as biomechanics, nanotechnology, and smart materials.

The vision for this vertical is to lead in innovation, from micro-scale material design to large-scale infrastructure projects, providing solutions that are not only innovative but also robust and resilient. Students and researchers will be encouraged to work on projects that combine theoretical mechanics with practical applications, allowing the department to continue its leadership in both academic and industrial research. This approach ensures that future mechanical designs are optimized for efficiency, sustainability, and technological advancements.



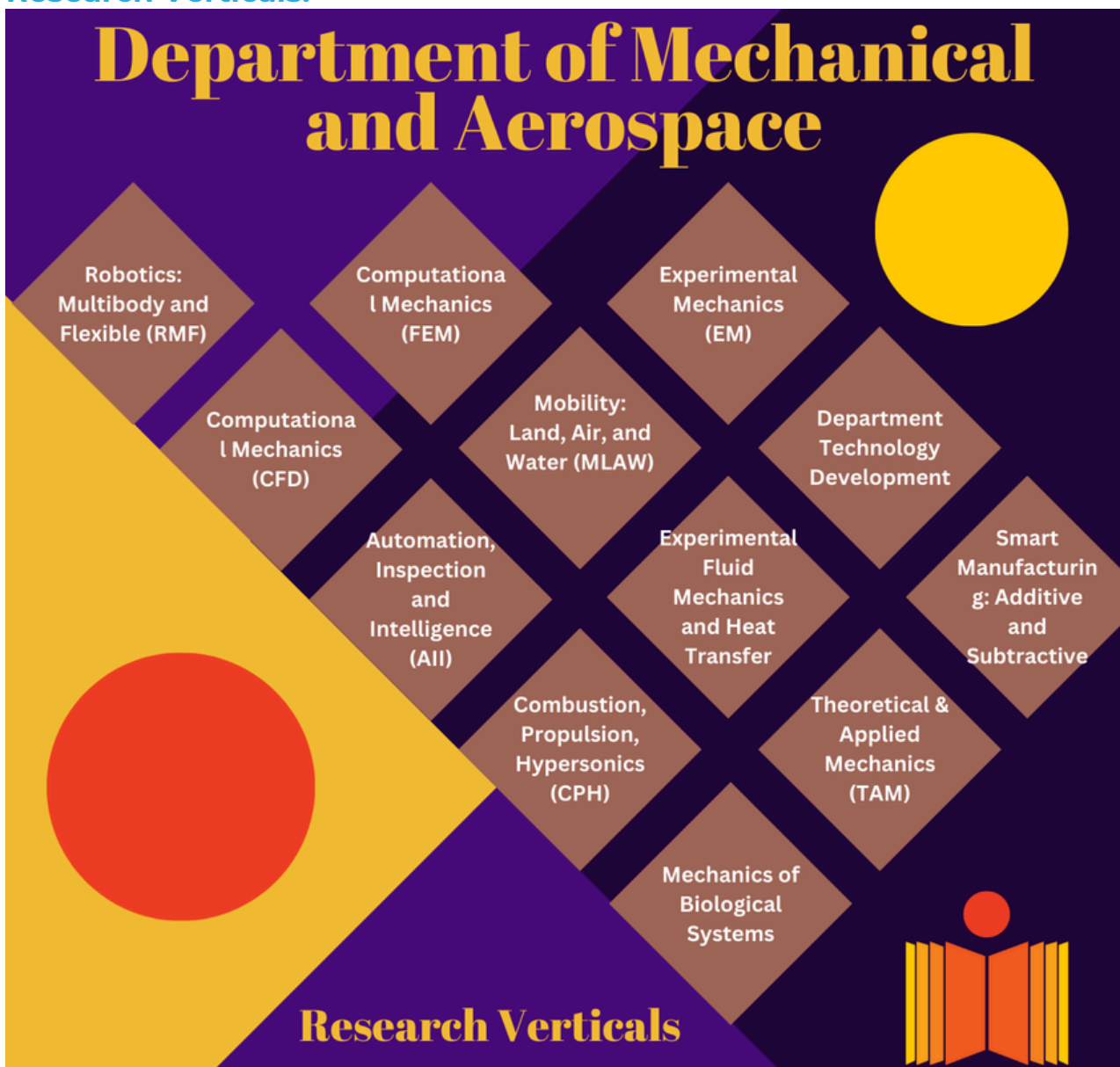
Thermo-Fluid Engineering In the Thermo-Fluid Engineering vertical, HoD underscores the department's commitment to addressing critical issues in thermodynamics, fluid mechanics, and heat transfer, especially in the context of global energy demands. With sustainability as a primary focus, this vertical plays a key role in developing renewable energy technologies, improving energy efficiency, and advancing cooling technologies.

The department aspires to become a global leader in energy research, contributing to solutions ranging from efficient building energy systems to propulsion technologies for aerospace applications. The research agenda includes a wide array of projects, from enhancing the performance of HVAC systems to reducing the carbon footprint of industrial energy consumption. This vertical's commitment to sustainable solutions aims to have a profound impact on the future of energy management and climate change mitigation.

Aerospace Engineering: Aerospace Engineering is one of the department's most prestigious verticals, and it continues to lead innovation in air and space travel. Prof. Ashok expresses pride in the department's advancements in propulsion, aerodynamics, and flight dynamics, which are vital to the future of aerospace technology.

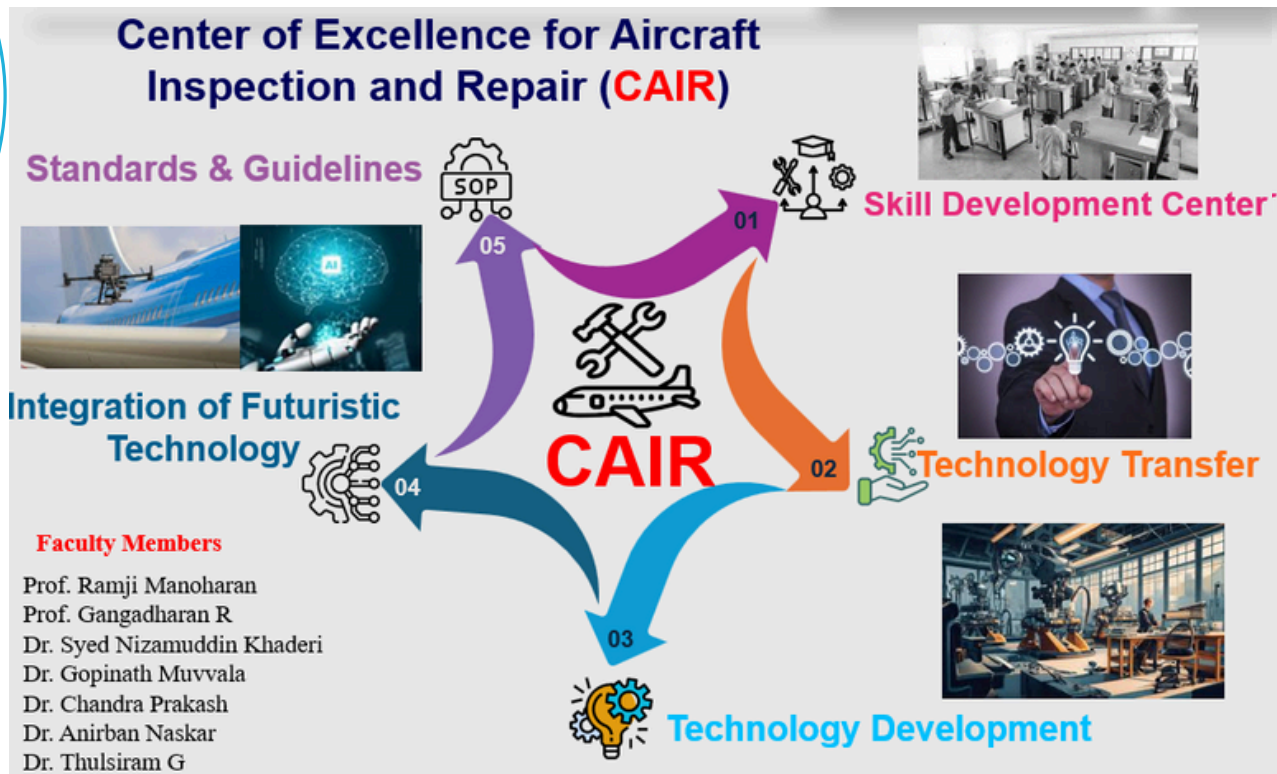
The department's vision for Aerospace Engineering includes fostering strong collaborations with industry leaders, defense agencies, and space exploration organizations. The focus is on expanding research in autonomous flight systems, unmanned aerial vehicles (UAVs), and space exploration technologies. This vertical aims to become a hub for cutting-edge aerospace research, driving innovations that contribute to both civil and military aviation. The department also envisions advancing projects in supersonic and hypersonic flight, space propulsion, and green aviation technologies to shape the future of global aerospace industries.

Research Verticals:



Proposed Center of Excellences (CoEs)

Center of Excellence for Aircraft Inspection and Repair (CAIR)



Center of Excellence for Ground Vehicle Aerodynamics (CEGVA)

Center for Excellence | Ground Vehicle Aerodynamics (CEGVA) | A proposal from MAE-IITH



Objective To develop a 3 m x 3 m x 3 m continuous closed-circuit subsonic wind tunnel capable of operating at 40 m/s for ground vehicle aerodynamic research and testing

Applications Multi terrain vehicle development, sports vehicle aerodynamics, vibration and dynamics, cabin noise isolation, ground effect studies, energy efficient transportation, mobility, educational purposes, other types of extra vehicular research, and aviation related studies

Total Estimated Cost: around 16 crores INR

Key Budget Items (tentatively)

❖ Design & Engineering	- 1,00,00,000 INR
❖ Construction	7,00,00,000 INR
❖ Fan/Blower System	- 1,00,00,000 INR
❖ Instrumentation	7,00,00,000 INR

(Quick realization through turnkey solution)

Potential Users DRDO Labs like ADA,

ARDB, ADE, DRDL, HAL, ISRO, Tata, Mahindra

Benefits For IIT Hyderabad

- Establishment of Research Leadership.
- Enhanced Academic Reputation.
- Interdisciplinary Collaboration.
- Industry Partnerships and Talent Development

Benefits For the Nation

- Global competitiveness of our automotive brands.
- Supports economic growth in the automotive sector.
- Advances STEM education initiatives.

Proposed Center of Excellences (CoEs)

Center of Excellence for RISE SMART (Robotic Intelligent Systems and Engineering in Soft, Marine, Aerial, Recreation, and Transport)

Team Members:

- Praveen Kumar R. Professor:** Tugboat safety, Smartport pilots, IISc postdoctoral fellow, IITM postdoctoral research fellow.
- Himanshu Alika. Assistant Professor:** Model predictive, Control of navigation and control, Sensor fusion, Sensor fusion, Sensor fusion.
- Prakash Kumar. Assistant Professor:** Full profile, Head, Robotics, Flying wing.
- Prakash Gupta. Assistant Professor:** Soft robotics, Robotic grippers, Flying wing.
- Vishnu R Unni. Assistant Professor:** Soft robotics, Sensor fusion, Flying wing.
- Sudhakar Palathingal. Assistant Professor:** Compliance mechanism, Systematic, Robot actuation, Robotics.

Central Diagram: Agriculture Robotics, Sensor Fusion, Entertainment Robotics, Marine Robotics, Aerial Robotics, Humanoird Robotics, Soft Robotics, AIML algorithms.

Applications and Images:

- Workshops and skill development** (Icon: Wrench and gear)
- Technology development** (Icon: Lightbulb)
- Academia-industry collabs** (Icon: Two people sitting at a table)
- Four quadcopters with rigid connection payload** (Image: Four quadcopters in flight)
- ROV platform for the detection of anomalies and close-range inspection** (Image: ROV platform)
- Walking humanoid robots** (Image: Humanoid robot in a hallway)
- Soft hand exoskeleton** (Image: Hand exoskeleton)
- Soft Grippers** (Image: Soft gripper)

Objectives:

- ❖ To develop robotic solutions for civil and scientific applications
- ❖ To be part in the development of intelligent robotic solutions for the defence sector of our nation

Center of Excellence - HAPPEN

Center for Hypersonics and Advanced Propulsion, Propellants and ENgines (HAPPEN @ IITH)

Developing Mission Critical Propulsion systems for Hypersonic Vehicles and Rockets; Developing and integrating advanced combustors for carbon-neutral fuels for 21st century land, air and water transportation needs.

<p>Facilities</p> <ul style="list-style-type: none"> Hypersonic Propulsion Facility: Supersonic Combustor Testing Facility; High Enthalpy flow tunnels. Hydrogen, Ammonia and Alternate Fuel Technology Facility: Advanced IC Engine test beds, Advanced burners and micro-engine test beds, gas-turbine combustor and thermoacoustic testing facility. High Energy Propellants and Explosives Testing Facility. Hypersonic and Reacting Flow CFD modelling tools and AI based optimization facility 	<p>Applications and Partners</p> <ul style="list-style-type: none"> DRDO, Defense and Navy:- Hypersonic Propulsion; Rocket Propulsion; propellants, missiles and explosives development; long range and heavy-duty drone propulsion. Engines, Gas Turbine and Energy OEM:- Carbon neutral fuel compatible combustors and burners. Automotive range extenders and hybrid systems. Development of engine diagnostic systems. Computational:- Development and integration of CFD tools and AI tools for high speed and multi-phase reacting flows. 	<p>Activities</p> <ul style="list-style-type: none"> Specialized courses and certification on design and modelling of advanced combustors, alternative fuels and hypersonic propulsion systems. Combined project and product development . Consultancy and testing of prototypes.
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Center Leads:- Dr. Raja Banerjee (CFD) and Dr. Pankaj S Kolhe (Experimental)
Collaborators:- Dr. Saravanan Balusamy, Dr. Venkatasubbaiah, Dr. Sayak Banerjee, Dr. S. K. Karthick, Dr. Lakshmana Chandrala, Dr. Gnanaprakash K, Dr. Niranjana Ghaisas, Dr. Vishnu Unni



Theme based Breakout Sessions

Manufacturing



Composite Structures & Material Characterization



Combustion, Propulsion and Hypersonic



Computational Mechanics



Incompressible and Compressible Flow



Robotics, Mobility, and Automation



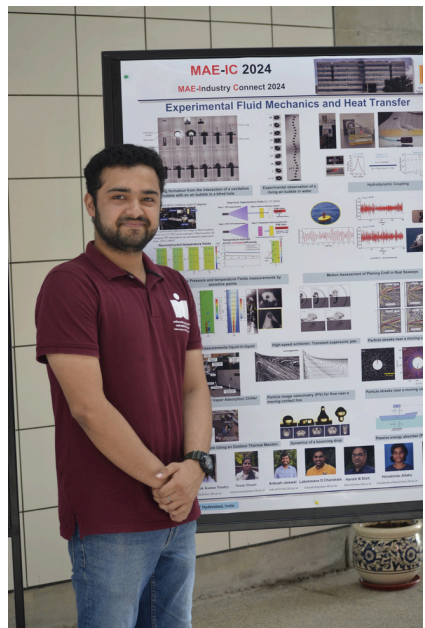
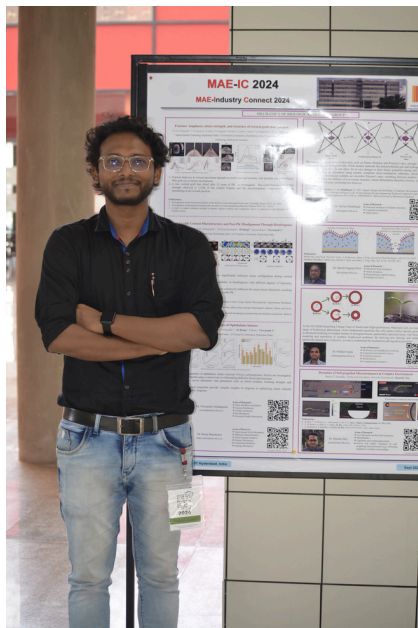
Lab visits



Poster Display



Poster Display



Tea Time



Research Feedback Session with Industry Experts

Agenda:

Discussion on research feedback and suggestions for strengthening the academia-industry collaboration in the MAE department at IITH.

Discussion Points:

Several industry participants appreciated the Academia-Industry Connect session and were impressed by the research being conducted in the MAE faculty labs. The following constructive feedback and suggestions were provided:

Separate Industry Areas for Discussion:

Suggestion: For future meetings, it was recommended to separate industries into different focus areas for more streamlined discussions and brainstorming.

Frequent Academia-Industry Connect Sessions:

Suggestion: Participants emphasized the need for these sessions to be held more frequently, suggesting bi-annual meetings to maintain continuous collaboration.

Instilling Problem Identification Skills in Students:

Suggestion: It was suggested that students be encouraged to identify problem topics themselves (especially during internships) to foster better collaboration between academia and industry.

Emphasis on the 'Big Picture' for Students:

Suggestion: Students should have a clear understanding of the 'big picture' in their field, enabling them to choose advanced courses in alignment with their long-term goals. Faculty should emphasize these broader concepts to guide students in their academic and professional paths.



Better Branding of MAE Research:

Suggestion: While significant research is being conducted within MAE, there is a need for better branding to show how this research impacts society and helps the common person. This will make IITH's work more relatable and impactful.

Guidance for Students on Course Choices:

Concern: Although students are given flexibility in their course selection, there is a risk they may choose the path of least resistance, which could have long-term consequences. More guidance may be needed to ensure they make informed choices.

Multidisciplinary System-Level Exposure for Students:

Suggestion: Students entering industry will face multidisciplinary, system-level problems. To prepare them, it was suggested that courses or internships should focus on connecting different subjects at a system level.

Synchronizing Academic and Industry Calendars

Concern: There may be a mismatch between the academic calendar and industry funding cycles (e.g., a company may have funding available in December, but admissions happen in May-August). This issue needs to be addressed for smoother collaborations.

Cryogenics Courses:

Question: An inquiry was raised regarding the availability of courses related to cryogenics in the current curriculum. In response, Prof. Ashok mentioned that Dr. Ankush might be able to include a few lectures on cryogenics within his proposed new course. This suggestion will be discussed further in the upcoming inter-department meeting.

Development of Indian Standards:

Concern: There is an over-reliance on European and Japanese standards, as many standards are not available in BIS. Faculty should engage more in developing material standards suited for local industry needs.

Connecting Academic Research with Industry System-Level Needs:

Concern: Industry operates on a system level, while academic research tends to be focused on specific areas. A stronger connection between the two is needed to make research more practical and applicable to industry needs.



Action Items:

- Consider separating industries into different focus areas for future meetings.
- Plan for bi-annual Academia-Industry Connect sessions.
- Explore ways to instill problem identification skills in students during internships.
- Emphasize the 'big picture' in student guidance.
- Develop a branding strategy for MAE research that highlights societal impact.
- Review and enhance guidance for students on course selection.
- Consider multidisciplinary courses or internships focused on system-level problems.
- Explore methods for better synchronizing academic and industry calendars.
- Investigate the possibility of adding a course on cryogenics.
- Increase engagement in developing material standards for BIS.
- Foster stronger connections between academic research and industry system-level requirements.



Student Interaction Session with Industry Experts

Key Points Discussed:

Immediate Job Openings:

- **Student Question:** How can students adapt to immediate job openings and new software?
- **Industry Response:**
 - Ensure that your resume is tailored to the specific job requirements; otherwise, it may get filtered out by screening software.
 - Highlight your thesis and research work well during interviews—this demonstrates your competence and smartness.

Use of ANSYS in Industry:

- **Student Question:** What kind of work does ANSYS involve at the industry level?
- **Industry Response:**
 - ANSYS is used for solving core mathematical problems, including partial differential equations and industry-specific use cases.

Disconnect Between Industry and Academia:

- **Student Question:** Is academia teaching what's needed in the real world? Should students focus on market preparation or core engineering problem-solving?
- **Industry Response:**
 - Stay updated with news and developments in the industry. Marks matter as they demonstrate competence, but upskilling is equally important.
 - Students must be prepared to answer basic engineering questions during interviews. It's essential to give clear, simple answers to complex questions.



Expectations for B.Tech, M.Tech, and PhD Graduates:

- **Student Question:** What is expected from B.Tech, M.Tech, and PhD graduates in the industry?
- **Industry Response:**
 - For PhDs, focus is on their ability to document research and handle another R&D problem. Contributions to research projects must be well-articulated.
 - There is a significant demand for aerospace PhDs in the industry.

Industry's Focus: Service-Based vs. Product-Based:

- **Student Question:** Are industries more service-based than engineering or product-based? How does self-reliance factor in?
- **Industry Response:**
 - India must move toward complete independence and self-reliance by minimizing reliance on importing sub-assemblies and focusing on reverse engineering and indigenous production.

Handling Mistakes in Industry:

- **Student Question:** How does the industry handle mistakes? Are they acceptable?
- **Industry Response:**
 - Mistakes are part of the process, but industries follow a structured system lifecycle, including requirements, validation plans, and audits.
 - There's room for failure, but risk calculation and mitigation, especially in areas like human safety, are critical.
 - A culture of speaking up about potential risks and mistakes is essential for safety and success.



Brainstorming on curriculum and Research Domains

Agenda:

To discuss the feedback from industry experts gathered on the first day of the MAE Industry Connect event and deliberate on potential changes to the academic curriculum to align with industry needs.

Mandatory Course on IP Laws, Research Ethics, and Safety

Issue Raised (From Day 1): Concern about industry sensitivity to IP laws and a suggestion to make an IP law course mandatory.

Discussion: Faculty agreed on the need for a course covering Intellectual Property (IP) laws, research ethics, and safety. The proposed course, named "Research Methodology," will be structured as a pass/fail course with zero credit and offered before students begin their internships. The course will consist of:

- 0.5 credit for IP laws
- 0.5 credit for research ethics
- 0.5 credit for safety

Action Item: Prof. Surya, Dr. Nirajan, Dr. Vishnu, and Dr. Sayak will deliberate further on the course structure, credits, and propose which semester this course should be offered.

Expansion of Instrumentation Lab

Issue Raised (From Day 1): Request to include courses on noise, vibration, and advanced signal processing.

Discussion: There was a proposal to expand the existing Instrumentation and Sensors Lab into a "Measurements and Signal Processing" course. The credit for this course will be increased from 2 to 3 to accommodate the additional content.

Action Item: Dr. Badarinath and Prof. Ramji can suggest revisions to the course curriculum to reflect these changes.



Elective Course Guidance for Students

Issue Raised (From Day 1): Concern about students being overwhelmed by the wide range of elective options.

Discussion: Faculty members agreed to increase their interaction with students every semester to guide them in their course selections. Additionally, the role of Faculty Advisors (FA) will be made clearer to both students and advisors, including their responsibilities for career and academic guidance.

Action Item: Regular semester-based faculty-student interaction sessions will be scheduled, and the roles of FAs will be outlined in a department circular.

Incorporation of Sustainability in All Courses

Issue Raised (From Day 1): Request for more sustainability-focused courses.

Discussion: It was decided that sustainability content would be integrated into the existing ME5010 course. Additionally, every course will incorporate sustainability concepts to ensure students are well-versed in this critical area.

Action Item: Faculty will review how sustainability can be embedded across the curriculum and not just in dedicated sustainability courses.

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Material Characterization in Solid and Fluid Mechanics

Issue Raised (From Day 1): Request for courses on characterization in solid and fluid mechanics.

Discussion: The faculty discussed preparing additional material for characterization techniques in Solid Mechanics (SM) and Fluid Mechanics (FM). Topics such as fluid rheology, surface tension, and physical demos using SEM images and optical microscopy will be included in the curriculum.

Action Item: Faculty members will collaborate to develop the necessary content for integration into SM and FM courses.

Incorporation of Sustainability in All Courses

Issue Raised (From Day 1): Request for courses on Non-Destructive Testing (NDT).

Discussion: Dr. Thulsiram will explore the possibility of creating a dedicated NDT module or integrating it into his new course to be offered.

Action Item: Dr. Thulsiram will work on designing this module for inclusion in the upcoming academic cycle.

Research Opportunities for 1st-Year Students

Issue Raised (From Day 1): Request for early research opportunities for first-year students.

Discussion: Faculty acknowledged that first-year students are already given opportunities to engage in research and agreed to improve communication to make students aware of these opportunities.

Action Item: Faculty will integrate this into their introductory sessions for new students to encourage early participation in research projects.

Structured Industry Internship Program

Issue Raised (From Day 1): Need for a structured approach to industry problems and internships.

Discussion: The faculty agreed to formalize the process by creating a system where industry projects, problem statements, abstracts, and internship opportunities are collected and shared with students. A Google form could be used to gather these details from industry partners.

Action Item: The department will work on designing this process, including the involvement of faculty to facilitate matching students with relevant industry problems.



Faculty Sabbaticals in Industry

Issue Raised (From Day 1): Suggestion for faculty members to take sabbaticals with industry to foster collaboration.

Discussion: Faculty were open to exploring this option further and agreed to review it as part of faculty development initiatives.

Action Item: The idea will be taken up for further discussion at upcoming departmental meetings.

FEM and CFD Course Proposal

Discussion: It was discussed whether the FEM Theory Lab and CFD Theory Lab can be synced to propose a combined 3-credit course focused on Finite Element Method (FEM) and Computational Fluid Dynamics (CFD).

Action Item: Faculty members will collaborate to develop the course structure for the proposed FEM-CFD course.

Introduction of Design Thinking

Discussion: The need to introduce design thinking to first-year students was raised, potentially through industry lectures.

Action Item: Prof. Raja and Prof. Ramji will deliberate on incorporating an advanced product life design cycle course.

Catchier Course Names

Discussion: A suggestion from the DAC regarding making course names more engaging and catchier was discussed.

Action Item: Faculty will consider this feedback while revising the course curriculum and names.



Thank *YOU*



Photo Gallery:

<https://photos.app.goo.gl/pLfEUDvfwgkEXoiSA>

Photography by : Mr Srikanth V and Mr Pullarao D