A Association of Royal Mechanical Students

INGENIUM

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Department Newsletter

Department of Mechanical Engineering

AJ Institute of Engineering and Technology

(A unit of Laxmi Memorial Education Trust ®)

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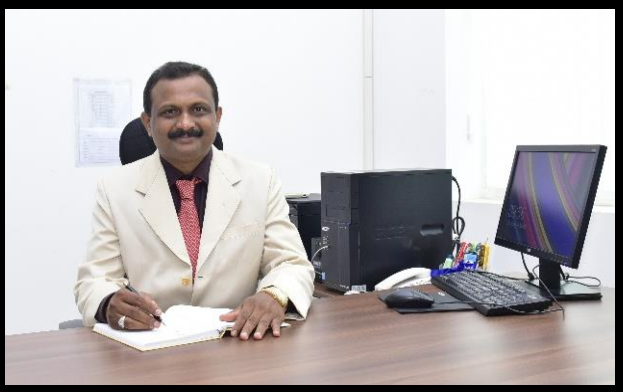
DEPARTMENT NEWSLETTER

Message from Editor's Desk:

Welcome to the third volume, third issue of Newsletter from the Department of Mechanical Engineering. This newsletter is a digital way for us to communicate with our students, faculty members, alumni and industrial partners. It aims to showcase the glimpse of the departmental activities and achievements. It enlightens the readers about the latest happenings in the department, focusing about different activities like placement, industry-academia, club activities, student and faculty achievements.

HOD's Message



Welcome to the third issue of the Mechanical Engineering Department Newsletter - 'IGENIUM' in its volume 3 series. It is about looking back and summing up every prestigious moment in the department. This newsletter is a bridge for us to communicate with our students, faculty members, alumni and industrial partners. It aims to showcase their achievements by which make them proud and self-motivated. We take the readers for a voyage of the latest incidence and happenings in the department. Any feedback will be greatly appreciated for the improvement of the next issue of the Newsletter.

Dr. Rajesh Rai P
Head, Department of Mechanical Engineering
A. J. Institute of Engineering and Technology

VISION

To create globally competent and self-reliant mechanical engineers adaptive to an interdisciplinary environment contributing to society through development, authority and entrepreneurship.

MISSION

- To offer high-quality graduate programme in the fields of Mechanical Engineering with value education to the students and make them responsive to societal needs.
- To nurture the students with a global outlook for a sustainable future with high moral and ethical values.
- To strengthen collaboration with industries academia and research organizations to enrich learning environment, thus enhance research and entrepreneurship culture.
- To create awareness about the need of interdisciplinary applications through alumni industry-institution interactions.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Prepare graduates with mathematical, scientific and engineering skills to design and develop energy efficient systems for sustainable development.

PEO2: Excel graduates with high level of technical competency combined with research and complex problem solving ability to generate innovative solutions in Mechanical and multi-disciplinary areas.

PEO3: Equip students with modern tools, technology and advanced software's for deliberating engineering solutions.

PEO4: Inculcate graduates with strong foundation in academic excellence, soft skills, leadership qualities, professional ethics, and social concerns and understand the need for lifelong learning for a successful professional career

PROGRAM OUTCOMES (POs)

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

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

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

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

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

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

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

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

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

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

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

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

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Apply the knowledge of modern engineering tools to design and Analyse the products and processes related to mechanical engineering system.

PSO2: Develop technical and interpersonal skills pertinent to mechanical and allied engineering for careers in industry, academia and government organistions.

RESEARCH

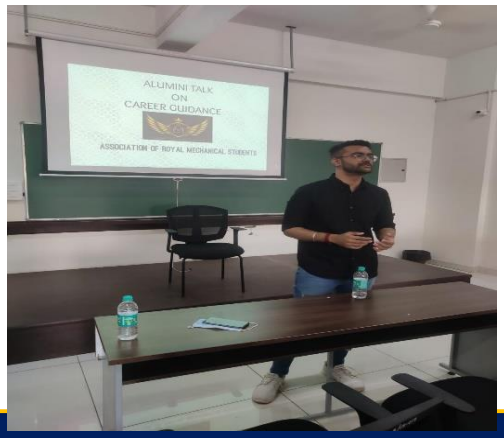
Domain Name	Domain Co-coordinator	Domain Members
MANUFACTURING	Dr. Rajesh Rai P	Mr. Prashanth D A, Mr. Nithin Shet, Mr. Prasad B G
THERMAL	Dr. Vighnesha Nayak	Dr. Sreejith B K, Mr. Prakhyath, Mr. Karthik A V
DESIGN	Mr. Sunil Kumar S	Mr. Sudheer Kini, Mr. Harold J D'Souza

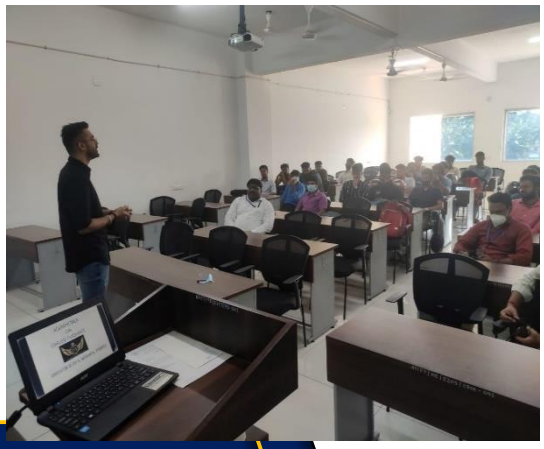
WORKSHOPS/WEBINAR/ EVENTS

Alumni Talk by Chirag Poonja (2017-2021) Batch student on 19-1-2022, at 11:00 AM.

The Department of Mechanical Engineering conducted Alumni Talk by Mr. Chirag Poonja (2017-2021) on 19th January 2022 for the 4th year Mechanical Branch students. Chirag is working as HR in Groww Technology. He shared his experiences of college days and the importance of subjects in Mechanical Engineering.

He discussed about the building of Industry contacts and also the need of individual portfolio to approach for jobs in media. He interacted with the students about the need and expectations of Industry. And also advised students to get trained in professional courses and utilize this pandemic period for earning more knowledge and update technical skills to get into the industry. The session was very informative and interactive for the students.





INDUSTRIAL VISIT

Industrial visit to Government Tool Room and Training centre

23 Students of 3rd Semester along with 1 faculty members visited Government Tool Room and Training center on 22-02-2022 at 10.00 AM. Initially, principal was explained vision, mission and background of GTTC. Then the students were taken around the Labs to show the various Machines like 3D Printing, CNC, IOT, Reverse Engineering etc. GTTC Faculty members were explained the process of

PLC controller, Awareness of the Software like CAE, CAD. It was very informative and useful for the students to get more exposure about the machines.

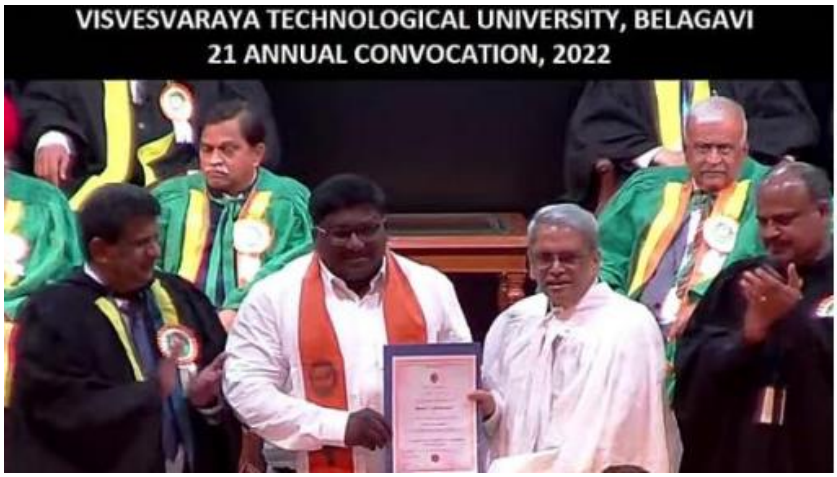
FACULTY PUBLICATIONS

Dr. Sunil Kumar S has published a paper entitled "***On Mechanical Response of Aluminum Alloys in Corrosive Environment"*** in INTERNATIONAL JOURNAL OF INTEGRATED ENGINEERING - VOL. 14 NO. 1 (2022) 48-56

FACULTY ACHIEVEMENT

Dr. Sunil Kumar S is awarded "**Doctor of Philosophy**" in 'The Faculty of Mechanical Engineering Sciences' for the thesis entitled "A Study on Influence of Corrosive Environment on Fracture Properties of High Strength Metallic Materials" at the 21st Annual Convocation 2022, Visvesvaraya Technological University - Belagavi on 10th March 2022.

Research Guide: Dr. Neelakantha V Londe



National Board of Accreditation (NBA)

What is accreditation?

Accreditation is a process of quality assurance and improvement, whereby a programme in an approved Institution is critically appraised to verify that the Institution or the programme continues to meet and/or exceed the Norms and Standards prescribed by regulator from time to time. It is a kind of recognition which indicates that a programme or Institution fulfills certain standards.

Why accreditation?

The purpose of the accreditation by NBA is to promote and recognize excellence in technical education in colleges and universities - at both the undergraduate and post graduate levels. Institutions, students, employers, and the public at large all benefit from the external verification of quality provided through the NBA accreditation process. They also benefit from the process of continuous quality improvement that is encouraged by the NBA's developmental approach to promote excellence in technical education. Through accreditation, the following main purposes are served:

- Support and advice to technical institutions in the maintenance and enhancement of their quality of provision;
- Confidence and assurance on quality to various stakeholders including students;
- Assurance of the good standing of an Institution to government departments and other interested bodies;
- Enabling an Institution to state publicly that it has voluntarily accepted independent inspection and has satisfied all the requirements for satisfactory operation and maintenance of quality in education.

Impact of accreditation

The purpose and impact of accreditation goes far beyond quality assurance of an Institution and its programs. Major impacts of accreditation system are summarized below:

- Encourages quality improvement initiatives by Institutions.
- Improves student enrolment both in terms of quality and quantity.
- Helps the Institution in securing necessary funds.
- Enhances employability of graduates.
- Facilitates transnational recognition of degrees and mobility of graduates and professionals.
- Motivates faculty to participate actively in academic and related Institutional/departmental activities.
- Helps create sound and challenging academic environment in the Institution, and Contributes to social and economic development of the country by producing high-quality technical manpower.

Benefits and Significance of Accreditation

Accreditation is a tool that stakeholders use to monitor, assess and evaluate the standards and quality of the education a student receives at a college, university or other institution of higher learning. Some of the major benefits enrolled students receive by attending an accredited institution/program are as follows:

- Accredited institution/program offers the highest quality education available;
- Accredited institution/program strengthens consumer's confidence, employers value degrees of an accredited program the most.
- Accreditation helps institutions to know their strengths, weaknesses and opportunities, pushes them to continuously improve their programs and give them a new sense of direction, identity and targets and
- Accredited institution/program demonstrates accountability to the public, commitment to excellence and continuous quality improvement

Who Gets Accredited?

Individuals, courses, and institutions are not accredited. NBA only accredits programs in Engineering, Computer Application, Pharmacy, Management, Hotel Management and Catering Technology.

Accreditation Policy

General Information on Accreditation

The following general policies are the guiding principles for accreditation of programs offered by various technical institutions:

i) NBA accredits selected technical Programs of institutions and not the Institutions or its Departments / Centres as a whole.

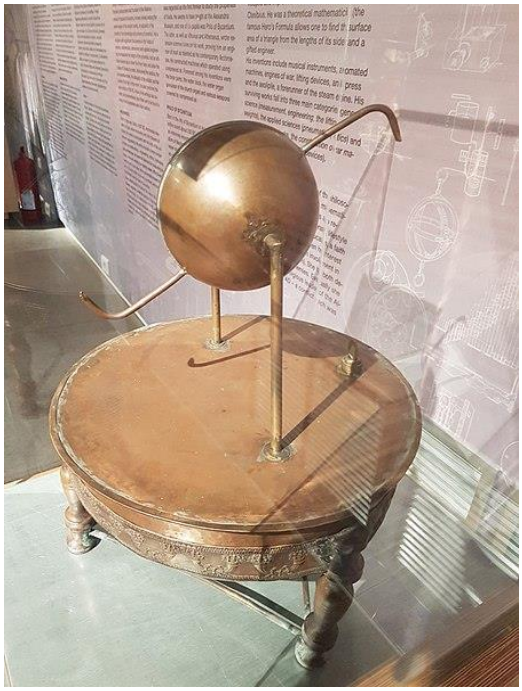
ii) Institutions are invited to apply for accreditation through eNBA portal as per norms prescribed by NBA from time-to-time.

iii) Programs to be accredited should be offered by an educational Institution, which has been formally approved by the AICTE or the concerned regulatory authority.

iv) Programs from which at least two batches of students have graduated are considered for accreditation. The program should continuously be running without break with approval of the concerned regulatory authority during the whole duration of last two batches (for example: 5 years for UG engineering, 3 years for PG engineering, etc.).

Mechanical Engineering Innovations That Helped Define Mechanics Today.

1. The Aeolipile was an early steam reaction turbine



The Aeolipile was the world's first rotating steam engine, or more technically correct, a steam reaction turbine. It was devised by the great **Heron of Alexandria** in the **1st Century AD** and described it in great detail in his book *Pneumatica*.

This relatively simple device works by heating a reservoir of water within the device to generate steam. The steam is then conducted through one of the copper supports to a pivoted brass sphere.

Once the steam reaches the sphere, it escapes through one of two nozzles at the ends of two, small, opposingly pointing arms. The escaping steam generates thrust and causes the sphere to rotate.

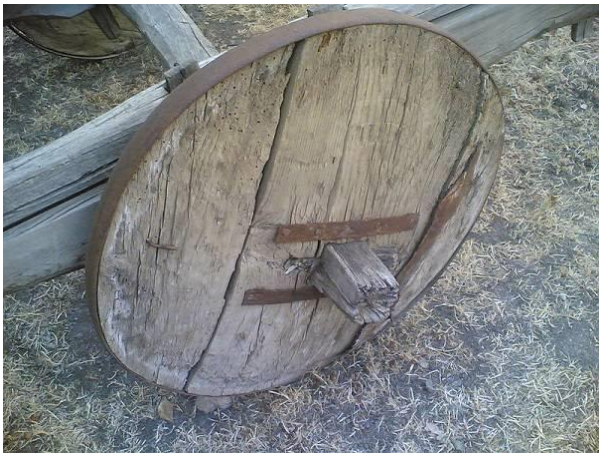
The basic principle is simple, but the device's real genius is that only one of the supporting arms pass steam to the sphere (via a sleeve bearing).

This pushes the sphere against the other, 'solid', supporting arm, which also has a thrust bearing. The solid arm includes a conical point that bears against a matching indentation on the surface of the sphere. This combination holds the sphere in place whilst it rotates.

2. Wheel and axle - A powerful simple machine

There are very few innovations in mechanical engineering that have had as much influence as the **wheel and axle**. The modern world would look very different without them.

The wheel and axle is one of the six simple machines as defined in antiquity and expanded during the Renaissance.



The first depictions of wheeled-vehicles appear on an earthenware *Bronocice* pot from Poland, and date to around **4000 BC**. The pot clearly depicts a wagon of some kind, with four wheels set on two axles.

The earliest actual evidence of a physical wheel-axle combination comes from Slovenia and is dated to around **3360-3030 BC.**

The invention of the wheel and axle literally changed the world, and has been an enduring feature of human transport devices for the past 6,000 years, and is likely to remain so well into the future.

3. Windmills began to replace manpower

Windmills are incredibly ingenious devices that are able to convert wind power into useful mechanical work. This is achieved by using large 'sails', usually made of wood, to impart a rotational force to the main shaft. This, in turn, can be used to do work, such as grinding flour.

The Persians were some of the first people to harness the power of the wind to do work when they began building early forms of **windmills** in Iran and Afghanistan in around the **7th Century AD**.

These early windmills consisted of sails radiating from a vertical axis within a building, with two large openings for the inlet and outlet of wind, diametrically opposite each other. The mills were used to directly drive single pairs of millstones without the use of gears.

They were one of the first means by which civilizations were able to directly replace human beings with machines as the main source of power.

Windmills would become increasingly widespread throughout Europe during the Middle Ages, and remained in common use well into the **19th Century.**

The development of steam power during the industrial revolution would lead to the eventual decline of windmills.

4. Pulleys make lifting things easy

Pulleys are one, or several wheels, on an axle or shaft that support the movement and a change of direction of a cable or belt (that is usually taut). They transfer power between the shaft and cable and provide a mechanical advantage that is ideal for lifting heavy objects.

Pulleys come in various types:

- A fixed pulley has an axle mounted on bearings attached to a support structure

- Movable pulleys have axles mounted on movable blocks.

- Compound pulleys are a mixture of the above two. The perfect example is the block and tackle pulley system.

The pulley was identified by the great Heron of Alexandria as one of the six basic simple machines. Today, pulleys are an integral part of many mechanical systems, including fan belts, flag poles, and water wells.

5. Humankind's obsession with flight shrunk the world

Long before the Wright Brothers were even born, humans have been trying to take to the air. One such lesser-known flight pioneer was **Brother Eilmer**. Eilmer was a monk from Malmesbury Abbey, England, who made an early attempt at flying in **1010 AD**.

An account of the event can be found in William of Malmesbury's twelfth-century book *Gesta Regum Anglorum*.

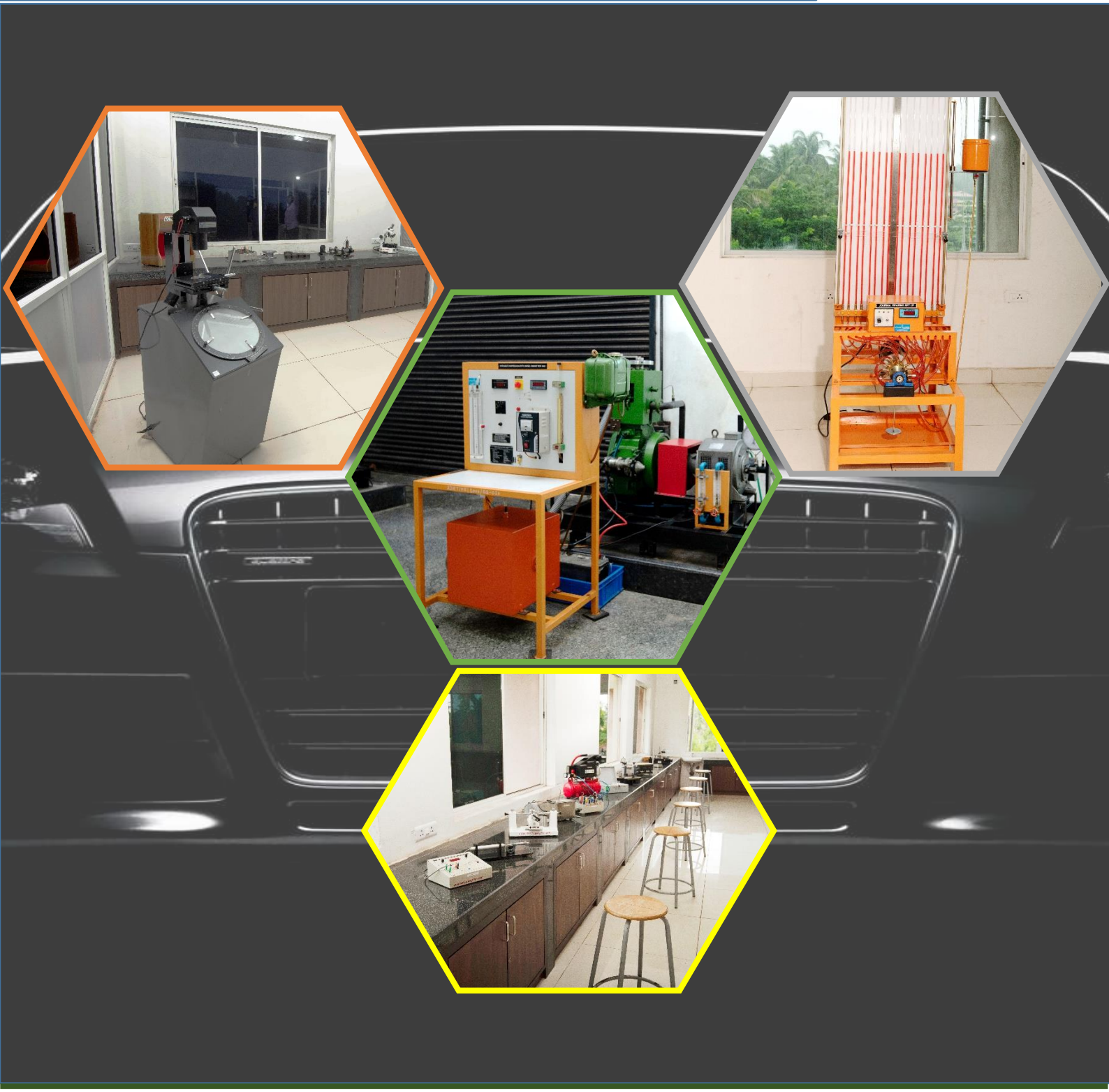
It is said that Brother Eilmer was inspired by the legend of Icarus to build a basic glider and attempt to fly. His glider was built from a wooden frame and either linen or parchment.

He succeeded in launching himself from a height of about **18 meters** above ground, and glided for around **200 meters,** before subsequently panicking and crashing, breaking both his legs.

Eilmer returned to the drawing board and planned for another flight, only to be stopped by an order from his Abbot against any further attempts.

Brother Eilmer's desire to fly, like that of others that followed him, from the seventeenth-century Ottoman Hezarfen Ahmed Celebi to the great Leonardo da Vinci, would drive our understanding of flight and aerodynamics.

Department of Mechanical Engineering



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