KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE
(An Autonomous Institute under Kakatiya University, Warangal)
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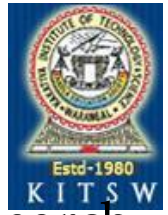
काकतीय प्रौद्योगिकी एवं विज्ञान संस्थान, वरंगल - ५०६ ०१५ तेलंगाना राज्य, भारत
కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం, వరంగల్ - 506 015. తెలంగాణ రాష్ట్రం, భారతదేశము
DEPARTMENT OF MECHANICAL ENGINEERING

Research Education Center
COMPOSITE MATERIALS

About the Center:



•The Composite Materials Lab, a pivotal addition to our Research Center, embodies our commitment to cutting-edge research and innovation.

•With the escalating demand for lightweight, durable materials, composites stand at the forefront of modern engineering.

•This introduction encapsulates our dedication to advancing knowledge, fostering interdisciplinary collaboration, and addressing contemporary challenges across industries.

•By providing state-of-the-art facilities and promoting industry partnerships, the lab aims to drive innovation, nurture talent, and facilitate the seamless translation of research into practical applications.

•Our endeavors in composite materials science and engineering herald a new era of technological advancement and transformative solutions for a dynamic world.

The primary functions of the center:

The laboratory fulfills the requirements for undergraduate, postgraduate, and doctoral research projects, as well as consultancy services related to material testing. The center serves as a dynamic hub for research, innovation, and collaboration, focusing on several key functions:

•**Research Excellence:** Conducting cutting-edge research across composite materials, addressing critical challenges, and advancing knowledge in fields ranging from science and engineering to social sciences and humanities
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•**Knowledge Dissemination:** Sharing research findings, insights, and discoveries through publications, seminars, and outreach activities to contribute to the global academic community and promote societal impact.

•**Innovation and Entrepreneurship:** Fostering a culture of innovation, entrepreneurship, and technology transfer by supporting startups, incubating new ideas, and commercializing research outcomes to address societal needs and drive economic growth.

Composite Materials Lab Equipment

S. No	Equipment	Cost (Rs.)
1	Universal testing machine (3TON load capacity, computerized operation)	6,49,000/-
2	Pin on disc machine (Standards as per ASTM G99 With Data acquisition of wear; laptop)Laptop: -Intel Core i3,	5,59,910/-
3	Izod/ Charpy impact tester (Load conditions 2.5Joule to 29 Joules, Digital output) HP 15q Core i5 8th Gen Laptop	1,81,290/-
4	Motorized Notch Cutter – Digital	48,380/-
5	Vacuum bagging set up	32,450/-
6	Scroll saw (composite cutter)	13,400/-
7	Mini Stirrer	15,340/-
Total Cost of Major Equipment :		**14,99,770/-**

Universal Testing Machine
(3TON load capacity, computerized operation)

•It is essential to comprehend the mechanical properties of materials for design engineering graduate to consider material for engineering applications.

• The mechanical properties such as tensile strength, flexural strength and shear strength shall be determined by using universal testing machine.

Izod/ Charpy impact tester (Load conditions 2.5 Joule to 29 Joules, Digital output)

- Materials subjected to sudden loads lead to catastrophic failure of system, so it is imperative for Mechanical graduate to learn about impact resistance of composite materials.

- Impact strength of the composite materials can be tested using Izod/ Charpy impact tester.

Pin on disc machine (Standards as per ASTM G99 With Data acquisition of wear; laptop)

- Mechanical graduate should have enough knowledge on Tribological behavior of materials.

- As the poor Tribological properties will cause severe wear which declines the operating conditions thereby increases chances of failure.

- Adhesive and abrasive wear mechanisms of composite materials can be evaluated by using pin on disc test rig.

Types of projects / research carried out with description:

List of projects that utilized available equipment in the composite materials lab during 2021-23 academic years.

S.No	Project Guide Name	Project Title
1	Smt. P. Anitha	Experimental Optimization of Dry Sliding Wear Behaviour of Metal Matrix Composites
2	D. Sammaiah	Effects of Water And Kerosene on The Weight Gain And The Impact Strength of FRP Composites: Plant Based Jute
3	Dr.K Rajanarender Reddy	Development And Characterization of Randomly Oriented Short Natural Fiber Composites
4	P.Divya	Evaluation of Mechanical Properties of Basalt Fiber Reinforced Composites
5	Sri Ch. Karunakar	Evaluation of Mechanical And Tribological Properties of Hybrid Cellulose Composites For Various Liquid Conditions

Contd..

6	M. Anil Kumar	Morphological And Tribological Properties of Sisal Cellulose Reinforced Composite Under Different Liquid Conditions
7	Dr.S Chandramouli	Experimentation Investigation And Characteristics of Aluminium Metal Matrix Composite8
8	Sri S Sripathy	Fabrication And Testing of Fibre And Nanoparticles Reinforced Polymer Composite Materials
9	Dr.M.Om Prakash	Tribological Behaviour of Biodegradable Composites
10	Dr. G. Srinu	Evaluation of Machining Performance And Sustainability Characteristics In Vegetable Oil Based MQL Machining
11	B.Rajesh	Material Characteristics of 3d Printed Reinforced Composite Material
12	Dr.J.Laxman	Experimental Study on Mechanical Properties of Metal Matrix Composite Materials
13	Dr. Md Sameer	Friction Stir Welding of Aluminium Alloy Reinforced With Al2O3 And And Graphite Nanoparticles
14	G.Srinivasa Rao	Banana And Ladyfinger Fiber Tensile Behaviour
15	V Pradeep	Microstructure And Wear Characteristics of Aluminium Metal Matrix Composites
16	Md. Sameer	Optimization of 3D Printing Parameters

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17	Dr. J. Laxman	Experimental Investigation of Microstructure And Mechanical Properties of Metal Matrix Composites
18	V.Srikanth	Mechanical Properties of Composite Materials
19	Dr.K.Raja Narender Reddy	Study on Mechanical Properties of Composite Materials
20	V Srikanth	Mechanical Properties of Composites
21	Dr K Raja Narender Reddy	Study on Mechanical Property And Characterization of Randomly Oriented Water Hyacinth (Eichhornia Crassipes) Fiber As Reinforcement With Guar Gum Matrix Material
22	Dr.P.Prabhakar Rao	Cold Spray Coating On Polymer Composites
23	K. Kishor Kumar	Investigation of The Mechanical Properties of A Kenaf-Banana Fiber Reinforced Composite
24	Dr Md Sameer	Tribological Properties of Aluminium Matrix Composite Reinforced With Al2o3
25	Dr K. Raja Narender Reddy	Development And Characterization of Water Hyacinth Fiber Reinforced GG Composites To Catalyse Sustainability.
26	Dr.A.Devaraju Sir	Fabrication And Characterization of Basalt Fiber Reinforced Composites
27	Dr. Md. Sameer	Parametric Analysis And Optimization of FDM Processed Parts Using Filaments

Importance of Lab in Core Placements

Familiarity with Equipment: Laboratories expose students to various types of equipment, machinery, and technologies commonly used in the mechanical engineering field. By gaining hands-on experience with these tools, students become familiar with their operation, maintenance, and safety protocols. This familiarity enhances their practical competence and makes them more industry-ready.

Collaboration and Teamwork: Laboratories often involve group work and collaborative projects. Students learn to work effectively in teams, sharing responsibilities, coordinating tasks, and communicating ideas. These teamwork skills are essential for success in the workplace, where engineering projects often require collaboration with colleagues from diverse backgrounds.

Experimental Design and Analysis: Laboratories provide opportunities for students to design and conduct experiments, collect data, and analyze results. These experiences enhance their understanding of the scientific method, research methodologies, and statistical analysis. Such skills are highly valued in research and development roles within the mechanical engineering industry.

Importance of Composite Materials Lab in Core Placements

Practical Application: Composite materials Laboratory provide students with hands-on experience, allowing them to apply the theoretical knowledge gained in classrooms to real-world situations. This practical exposure helps them develop a better understanding of concepts and principles related to Composite Materials.

Skill Development: Laboratories offer opportunities for students to develop essential technical skills, such as operating machinery, using tools and equipment, conducting experiments, and analyzing data. These skills are highly valued by potential employers as they seek candidates who can effectively translate theoretical knowledge into practical applications.

Problem Solving and Critical Thinking: Composite materials Laboratory provide a platform for students to encounter and solve real engineering problems. Through experimentation, troubleshooting, and analysis, students learn to think critically and develop problem-solving skills. This ability to tackle challenges is highly sought after by employers in the mechanical engineering industry.

Importance of Lab in Core Placements

Safety Awareness: Laboratories emphasize the importance of safety protocols and practices. Students learn to identify and mitigate potential hazards, understand safety guidelines, and work in a controlled environment. This knowledge and awareness of safety standards are critical in ensuring the well-being of themselves and their colleagues in professional settings.

laboratories in core placements for mechanical engineering students play a vital role in bridging the gap between theoretical knowledge and practical skills. They provide a conducive environment for students to develop technical competence, problem-solving abilities, teamwork skills, and a deeper understanding of the mechanical engineering field. These attributes make students more desirable candidates for employers in the industry.

Thank you!!!!!