

# YANTRA

Innovate. Build. Evolve

## MECHANICAL ENGINEERING NEWSLETTER



### AACAR 10.0: DRIVING HANDS-ON LEARNING AND TECHNICAL EXCELLENCE

Organized on 6-7 September 2025, AACAR 10.0 offered students a powerful blend of conceptual clarity and hands-on experience in automobile engineering.

### MECHANICAL ENGINEERING STUDENTS EXCELLED AT THE CII-SKILL-WILL-LEAD 2025, INTER-COLLEGE TECHNICAL PRESENTATION COMPETITION HELD DURING SEPTEMBER 2025.

Mechanical Engineering students grabbed cash prizes of ₹90,000, marking an exceptional achievement and demonstrating the college's strong culture of innovation, technical competence, and presentation excellence.



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## MESSAGES

**PROF. AMITA DEV, ADVISOR**

I am delighted to present the first Biannual Newsletter of the Department of Mechanical Engineering, which captures the academic progress, innovative initiatives, and notable achievements of the department. This inaugural edition reflects the collective spirit of excellence, dedication, and continuous learning demonstrated by both students and faculty.

The Department of Mechanical Engineering has been steadily strengthening its foundation by blending strong theoretical knowledge with practical exposure, research orientation, and industry relevance.

I extend my sincere appreciation to the faculty members for their committed mentorship and academic leadership. I also commend the students for their enthusiasm, discipline, and willingness to explore beyond the classroom. Such collaborative efforts play a vital role in shaping a vibrant academic ecosystem.

I am confident that the Department of Mechanical Engineering will continue to grow in stature, contribute meaningfully to technological advancement, and uphold the highest standards of academic excellence. I wish the department continued success in all its future endeavors.

**PROF. HEMANT AHUJA, DIRECTOR** to quality education, research, and student development.

I am pleased to present the first Biannual Newsletter of the Department of Mechanical Engineering, which highlights the academic accomplishments, innovative practices, and collective efforts of the department. This inaugural edition marks an important step in documenting the department's journey and showcasing its commitment

The Department of Mechanical Engineering has consistently demonstrated dedication towards strengthening core engineering fundamentals while embracing modern technologies, interdisciplinary learning, and industry-oriented practices. I extend my sincere congratulations to the faculty members for their academic leadership, mentorship, and continuous efforts in creating a conducive learning environment. I also appreciate the students for their enthusiasm, discipline, and proactive participation in academic, technical, and co-curricular activities.

I encourage the Department of Mechanical Engineering to continue striving for higher standards, innovation, and impactful contributions to society. I am confident that the department will achieve greater milestones in the years ahead and bring continued recognition to the institution.



## MESSAGES



**PROF. DEVENDRA SINGH, HOD**

I am happy to present the first Biannual Newsletter of the Department of Mechanical Engineering, which showcases the academic achievements, technical initiatives, and collective efforts of our students and faculty. This inaugural edition represents an important milestone in documenting the department's activities and reflecting its steady progress towards academic excellence and innovation.

The Department of Mechanical Engineering remains committed to delivering strong foundational knowledge while promoting experiential learning, research orientation, and industry interaction. The accomplishments and initiatives highlighted in this newsletter reflect the department's focus on skill development, creativity, teamwork, and the application of engineering principles to real-world challenges.

I take this opportunity to congratulate the faculty members for their sincere dedication, mentorship, and continuous efforts in creating a vibrant and learner-centric academic environment. I also commend our students for their enthusiasm, discipline, and active participation in academic, technical, and co-curricular activities, which significantly contribute to the department's growth and visibility.

I am confident that the Department of Mechanical Engineering will continue to evolve, achieve new milestones, and uphold the highest standards of teaching, research, and professional ethics. I wish the department continued success in all its future endeavors.

## MISSION AND VISION OF THE DEPARTMENT

### MISSION

M1: Assist students in acquiring and maintaining the necessary theoretical and practical Mechanical Engineering knowledge.

M2: To keep students up to date on the latest innovations in Mechanical Engineering

M3: Assisting students in becoming global engineers to address society's relevant and timely needs.

### VISION

To produce professionally competent, socially sensitive, motivated, honest and dedicated mechanical engineers capable of working in multicultural global environment.



## ACADEMIC PERFORMANCE

### PRE UNIVERSITY TEST 2025-26 ODD SEMESTER



**SATVIK SINGH, OVERALL TOPPER**  
**SECOND YEAR MECHANICAL**



**GARV BHARDWAJ, OVERALL TOPPER**  
**THIRD YEAR MECHANICAL**



**DHRUV GARG, OVERALL TOPPER**  
**FINAL YEAR MECHANICAL**

The **Pre-University Test** is an internal assessment conducted prior to the University Examinations to evaluate students' overall preparedness. Before the Pre-University Test, a Sessional Test is conducted which covers approximately half of the syllabus and helps in assessing students' understanding of core concepts at an intermediate stage. The Pre-University Test covers the complete syllabus as prescribed by the university, allowing students to familiarize themselves with the examination pattern, depth of questions, and time management requirements of the final examination. This assessment plays a vital role in identifying learning gaps, strengthening conceptual clarity, and guiding students towards focused revision. It has been consistently observed that the toppers of these internal examinations largely emerge as University toppers and maintain their academic positions across successive semesters. The department **congratulates** these students for their sustained excellence, discipline, and dedicated efforts.

## PEER MENTORSHIP

Peer Mentorship is an effective academic support initiative in which senior or academically strong students guide their peers in understanding complex subjects of Mechanical Engineering such as Strength of Materials, Thermodynamics, Material Engineering, and related core courses. Through peer-to-peer interaction, students often feel more comfortable asking questions, discussing doubts, and revisiting fundamental concepts at a pace suited to their learning needs. This approach simplifies difficult topics by encouraging problem-solving through shared experiences, practical examples, and collaborative learning.

The Peer Mentorship initiative also helps in building confidence, improving academic performance, and reducing hesitation towards traditionally challenging subjects. Mentors reinforce their own understanding while mentees benefit from relatable explanations and study strategies. Overall, this initiative fosters a culture of cooperation, responsibility, and academic excellence, making it a valuable component of the department's student-centric learning ecosystem.



Mr. Akarsh Mishra, a 4th year B.Tech Mechanical Engineering student, conducted mentorship sessions in Thermodynamics and Manufacturing Process. His peer-learning approach, clarity in concepts, and effective guidance helped juniors strengthen fundamentals, improve numerical skills, and enhance overall academic performance. His sessions significantly contributed to better understanding and confidence among students.



Mr. Yash Chandra, a 4th year B.Tech Mechanical Engineering student, mentored juniors in Material Engineering and Strength of Materials. He simplified difficult topics, focused on numerical accuracy, and provided relatable explanations. His supportive approach improved students' conceptual clarity, reduced common errors, and contributed to improved subject-wise outcomes and student confidence.

**DEPARTMENT OF MECHANICAL ENGINEERING CONGRATULATES FOLLOWING  
STUDENTS FOR GETTING PLACED**



**DHRUV CHAUHAN**  
CVENT, 6 LPA



**AKARSH MISHRA**  
SMS GROUP, 5.5 LPA



**RISHABH SHARMA**  
JACKSON GROUP, 5 LPA



**GAUTAM ARORA**  
JACKSON GROUP, 5 LPA



**UMANG KATIYAR**  
JACKSON GROUP, 5 LPA



**TANMAY GUPTA**  
VIVO MOBILE, 4.2 LPA



**UTKARSH TIWARI**  
VIVO MOBILE, 4.2 LPA



**SHREYANSHI SRIVASTAVA**  
PPAP AUTOMOTIVE, 3. 6 LPA

**CONGRATULATIONS**

## STUDENT AWARDS AND RECOGNITIONS

CII SKILL-WILL-LEAD 2025 Inter-College Presentation Competition, is aimed to enhance professional skills, leadership qualities, and innovative thinking. The event provides a valuable platform for students to demonstrate their presentation and analytical abilities while gaining exposure to industry-oriented perspectives and inter-institutional interaction.

Mechanical Engineering students from Ajay Kumar Garg Engineering College delivered an exceptional performance in the CII SKILL-WILL-LEAD 2025 inter-college presentation competition. They secured top honours across multiple host institutions—AKGEC (1st Prize, ₹30,000 – Design Thinking Process), ABESEC (1st Prize, ₹30,000 – India's Air Missile and Defence Systems), GLBITM (2nd Prize, ₹20,000 – Predictive Maintenance with AI), and KIET (3rd Prize, ₹10,000 – Advanced Materials for Spacecraft).

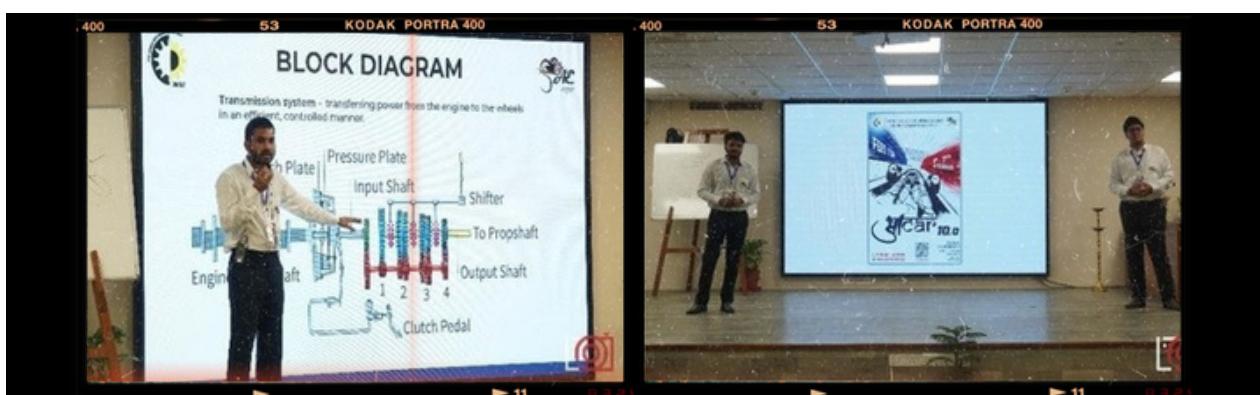
Mechanical Engineering students grabbed cash prizes worth ₹90,000, marking an exceptional achievement and demonstrating the college's strong culture of innovation, technical competence, and presentation excellence.



## CO-CURRICULAR ACTIVITIES

The **Society of Automotive Engineers** (SAE)-AKGEC Collegiate Club organized the “AACAR” workshop for first- and second-year students. This two-day workshop is conducted every year with the objective of familiarizing the participants with the SAE India Collegiate Club at AKGEC and its activities. The workshop provides an introduction to automotive engineering fundamentals, team-based learning, and hands-on exposure through interactive sessions. It also motivates students to participate in technical events, projects, and competitions under the SAE platform, thereby nurturing innovation, teamwork, and practical engineering skills from the early years of their academic journey.

This year AACAR 10.0 was an immensely successful event, engaging 170+ students in technical sessions, overhauling workshops, and competitive activities.



## STUDENT ACHIEVEMENTS - EXTRACURRICULAR & SPORTS



Dev Vishwakarma received the Runner-Up Trophy for Mr. Antaragni at IIT Kanpur. Antaragni is the prestigious annual cultural festival of IIT Kanpur, renowned as one of India's largest and most vibrant college fests. Antaragni provides a national platform for young talent to showcase creativity, personality, and leadership. This achievement reflects Dev's confidence, versatility, and exceptional stage presence in such a highly competitive arena.



Tanmay Srivastava (B.Tech ME, 3rd Year) Silver Medalist in High Jump at Saksham'25; participated in Discus Throw at AKTU Zonals'25 and Triple Jump at Udgosh'25.



Yash Sharma (B.Tech ME, 2nd Year) Winner of 1st in Long Jump and 2nd in 100m and Relay at AKTU States'25; also participated in Udgosh'25.



Ridhima Ashta (B.Tech ME, 2nd Year) Silver Medalist in Volleyball and Shotput at AKTU Zonals'25, Saksham'25, and Udgosh'25; also secured Second Position in Zonals.



Ark Sharma (B.Tech ME, 2nd Year) Silver Medalist in Volleyball at AKTU Zonals'25; participated in Saksham'25 and Udgosh'25.



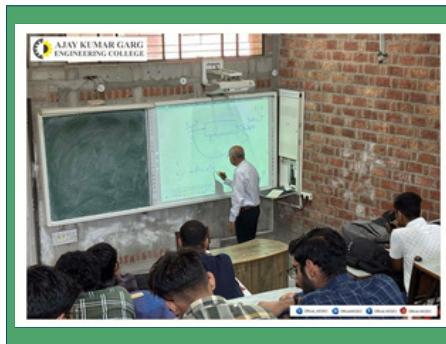
## GUEST LECTURES



We have the proud privilege of hosting **Prof. Wolf Burger**, Senior Expert at SES Bonn and former Professor at Baden-Wuerttemberg Cooperative State University, Germany. Prof. Wolf Burger delivered a guest lecture on the **EV Ambulance Project for rural areas of Africa**, highlighting sustainable and affordable electric mobility solutions aimed at improving healthcare access and benefiting rural communities while promoting environmental responsibility on 14th Nov 2025 for the students of Mechanical Engineering.



A highly insightful guest lecture on “Ladle Preparation / Steel Making” was held on 15th October 2025 for 2nd-year B.Tech Mechanical Engineering students in offline mode. The session was delivered by **Mr. Suresh Tiwari**, who brings 37 years of extensive experience at the Steel Authority of India Ltd. (SAIL). The lecture offered valuable insights into steel-making processes, ladle preparation, and practical industrial practices, significantly enhancing students' understanding of real-world metallurgical and manufacturing applications.



## VISHWAKARMA PUJA CELEBRATION

The Mechanical Engineering Department celebrated the Vishwakarma Puja on 17th September 2025 in the Mechanical Engineering Workshop with great devotion and enthusiasm. The ceremony was graced by Advisor Prof. Amita Dev and Director Prof. Hemant Ahuja, who performed the puja. The event saw the active participation of the Director AKGIM, Heads of Departments, Deans, faculty members, staff, and students.

During the celebration, prayers were offered to Lord Vishwakarma, seeking divine blessings for the efficient, safe, and smooth functioning of tools, equipment, and machinery used in the department. The event fostered a sense of unity and reverence, symbolizing the importance of craftsmanship, engineering precision, and technological advancement.

The celebration truly embodied inclusivity, tradition, and the spirit of engineering excellence that AKGEC upholds. The Mechanical Engineering Department ensured that the event was conducted with proper arrangements, maintaining decorum and cultural significance throughout.



# PATENT GRANTED



Dr. Suman Gothwal, Associate Professor, was granted Design Patent on AI Based Women Safety Detecting Wrist Band, No :441224-001, on 06/03/2025



## RESEARCH PUBLICATIONS



Gangil, N., Mishra, A., Lone, N.F. et al. Linear Friction Welding of Similar and Dissimilar Materials: A Review. *Met. Mater. Int.* 31, 1–21 (2025).

**Abstract:** Linear friction welding (LFW) has distinction of being a unique process which can join components in a variety of materials, shape and size configurations in an extremely low cycle time. The conventional arc welding, friction stir welding and rotary friction welding are also very popular and a lot of work has been reported on materials joined by these processes. The ability to join huge and small size parts, in a variety of similar and dissimilar materials, shapes and sizes make LFW un-paralleled. Such joint configurations are very common in transportation sectors including aerospace and railways. Very little work is reported on the LFW process in comparison to aforementioned popular welding processes. An attempt is made in this article to present the state of the art on LFW of various materials in similar and dissimilar combinations. Materials in promising applications such as space, aircraft, aerospace and railways are the main focusses. This work is expected to act as a single window to showcase all aspects of LFW on ferrous and non-ferrous materials in similar and dissimilar combinations. The manuscript begins with an overview on the principle of operation and classification, and subsequently extends the topic to detailed discussion on the joint characteristics, microstructure, material combination and application domain. The literature on LFW was studied and classified based on similar and dissimilar materials, effects of parameters on properties and microstructure responses, evolution of heat and stress conditions, and applications. The article presents, at the end, a meticulously carved out concluding summary which is expected to provide future directions and also an easy to figure out coverage on the discussion.

## RESEARCH PUBLICATIONS



Pradeep Jain, A Comprehensive review on hydrogels innovation in extrusion based 3D printing, International Journal of science engineering and management, July 2025, 2456-1304.

**Abstract:** Additive manufacturing has led to the emergence of hydrogel inclusion in 3D printing using extrusion techniques as a step toward manufacturing and expansion of new areas for environmental applications, biomedical use or tissue engineering. This study examines recent advances in the printing methodologies for hydrogel formulations and their multiple uses in extrusion-based 3D printing. We review the developments in terms of print quality, functionalization, material improvements, cross-linking mechanisms and system compatibility. We also discuss medical applications such as drug delivery systems and tissue scaffoldings as well as ecological implications like water purification and use of biodegradable materials associated with hydrogel-based 3D printing. This Research paper aims to provide an insight into modern innovations on hydrogels based on extrusion techniques for 3D Printing.

Pradeep Jain, Recent Advances in 3D printing and its applications, International Journal of Multidisciplinary research, July 2025, 2582- 2160.

**Abstract** Three-dimensional (3D) printing or additive manufacturing has revolutionized design and production by enabling complex geometries and personalized parts that were infeasible with traditional manufacturing methods. In the past five years, new materials (e.g. advanced polymers, composites, ceramics, hydrogels and even smart alloys) and processes (e.g. 4D-printing, bioprinting) have dramatically expanded 3D printing's capabilities. For example, modern systems can now print metals, fiber-reinforced plastics, and biodegradable polymers.



## RESEARCH PUBLICATIONS

Pradeep Jain, Wire Arc Additive Manufacturing for Metal 3D printing, International Journal of engineering and manufacturing research, July 2025, 2249-3115.

**Abstract :** Wire Arc Additive Manufacturing (WAAM) is a type of Manufacturing System to produce metal objects using a 3D printer. Additive manufacturing (AM) helps overcome issues with traditional methods, especially for making big parts with less waste. WAAM uses three main heat sources. gas metal arc welding (GMAW) is the easiest to use, using a continuous wire spool with the torch, which is more convenient than gas tungsten arc welding (GTAW) and Plasma Arc Welding (PAW). Despite its increasing adoption in 3D metal component fabrication, WAAM encounters challenges in process control due to the inherent generation of residual stress and distortion from the high thermal input of its heat sources. The persistent issues of distortion and residual stress present ongoing hurdles for WAAM, potentially compromising the manufactured components, geometric accuracy, and mechanical properties. This paper provides a thorough review of wire arc additive manufacturing technology for 3D metal printing, examining their respective advantages and limitations. Researchers have focused on finding the results of changing the speed, thermal profile, phase transformation, and residual stresses on WAAM-produced components. By understanding and optimizing these parameters, WAAM processes can achieve improved microstructure and mechanical properties of fabricated metals and alloys. Studies utilize simulations and experimental analyses to explore the intricate interactions between process parameters and resulting material properties. Additionally, the paper reviews the optimized study to obtain a good quality product from WAAM which gives us a broad view of WAAM, here past studies have been discussed comprehensively.



## RESEARCH PUBLICATIONS



Singh, K., Shanker, H., Singh, A.P. (2025) "Mechanical and Microstructural Properties of GMAW Welded Ferritic AISI 1080 Carbon Steel (UNS G10800)" Recent Trends in Material Processing, Characterisation and Applications (AEMTA 2024). Springer Proceedings in Materials, First Online: 29 August 2025, pp 635–647, vol 73. Springer, Singapore.

**Abstract :** Finding appropriate connecting methods for the widely used AISI 1080 Carbon Steel plates across numerous sectors can be challenging. When ferritic carbon steels like AISI 1080 are joined, coarser grains are formed in fusion zone, reducing toughness and ductility of metal assembled. To address this, a controlled and well established welding process is required. With its distinct benefits over other welding processes, the advanced robotic GMAW welding process is considered to be the optimum solution to weld a UNS G10800 Ferritic AISI 1080 Carbon Steel. Mechanical and microstructural properties of welds are examined as part of the examination. Weld metal (WM) has a greater tensile strength (TS) than both the base material and the heat-affected zone. The lowest measured hardness of (170 HV), or 74.88% of the weld metal declared hardness, was found in the base metal, according to the results of the hardness tests. To do microstructural analysis, micrographs of the WM, HAZ, and BM are taken and examined. These assessments offer fascinating details about the characteristics and behaviour of the material during the process of welding.

Hari Shanker, Ashutosh Kumar Yadav, Pallab Biswas. "Mechanical and Microstructural Characteristics of Rice Husk Ash Reinforced Aluminium Metal Matrix Composite: A Review", Proc IMechE Part C: J Mechanical Engineering Science, 27 Nov 2025, Accepted, Under Publication (SCIE Indexed, Impact Factor: 2.0)

**Abstract :** In the fabrication of composite materials, reinforcements are essential due to their longevity and performance. Nowadays, nearly every industry in the world uses composites rather than ferrous alloys to create lightweight mechanical components with enhanced properties of the raw materials. The current analysis illustrates the utilization of agro-waste materials as reinforcement instead of more conventional synthetic reinforcements. Rice husk ash, individually as well as with other reinforcement particles, has been studied to improve the tribological characteristics, hardness, tensile strength, bending strength, and other attributes of composites as they are being used to fulfill the demand of the current industry. The goal of this analysis is to examine the methods used to create an Al-composite in single and hybrid form with the RHA reinforcement particles. It also looks at how adding RHA as a reinforcing material in both single and hybrid modes improve the composite's compressive strength, impact strength, hardness, resistance to wear, and ability to resist corrosion while lowering its density. The study reveals that the 5wt.% RHA-reinforced sample had the lowest density, maximum hardness rating, and the least amount of porosity in single as well as in hybrid mode.

## WAY FORWARD FOR 2026

- Strengthen academic quality through outcome-based and project-oriented teaching-learning practices. Enhance research output by promoting multidisciplinary and collaborative research initiatives.
- Build strong industry partnerships for internships, expert lectures, live projects, and consultancy. Introduce skill-based training in emerging areas such as Electric Vehicles (EVs), Robotics, Artificial Intelligence, and Smart Manufacturing.
- Improve student performance through structured mentoring, remedial classes, and continuous academic support. Enhance placements via targeted skill-building, career readiness programs, and industry exposure.
- Expand consultancy, innovation, and entrepreneurial activities within the department. Adopt digital tools and systems to support academic and administrative excellence.
- Align departmental processes and infrastructure with the upcoming transition to Ajay Kumar Garg University. Establish a dynamic, industry-connected, and research-driven Mechanical Engineering Department committed to excellence and continuous growth.

## FORTHCOMING EVENTS

- International Conference in collaboration with reputed international institutions and industry partners. Industry-Academia Interaction Series with experts from automotive, manufacturing, and drone sectors.
- Hands-on Workshop on EV Technology and Smart Manufacturing for students and faculty. National Level Technical Fest / Mechanical Symposium with competitions, paper presentations, and quizzes.
- Faculty Development Program (FDP) on Outcome-Based Education and Emerging Technologies. Student Skill Development Bootcamp focusing on CAD/CAE, Robotics, and Industrial Automation.
- Research & Innovation Meet to promote multidisciplinary projects, patents, and consultancy. Industrial Visit Series to advanced manufacturing units and R&D centers. Alumni Interaction and Mentoring Session for career guidance and placement readiness.





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