

DEPARTMENT OF MECHANICAL ENGINEERING



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**GANGA INSTITUTE OF TECHNOLOGY
AND MANAGEMENT, KABLANA**



GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

DEPARTMENT OF MECHANICAL ENGINEERING

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DIRECTOR'S MESSAGE



DR. AMAN AGGARWAL

GITAM, KABLANA

“ ‘Mech G Connect’ (ME newsletter), vol.2 is a testament to the collaborative spirit and passion of faculty and students of Mechanical Engineering Department. We aim to foster a strong sense of belonging, connecting students, faculty, and alumni on a common platform. I extend my gratitude to the editorial team and all contributors for their dedication in making this newsletter possible. I encourage all readers to engage with the enriching content and stay connected with our ever-evolving community. Wishing you an enjoyable read and looking forward to the continued growth and success of ‘Mech G Connect’.

HOD'S MESSAGE



MR. VIVEK

GITAM, KABLANA

“

I am thrilled to announce the release of our Departmental Newsletter, “MECH G CONNECT.” This publication showcase our achievements and student accomplishments. I extend my gratitude to the Newsletter Committee for their hard work and contributors for enriching the content. The newsletter will be a continuous project, welcoming your future contributions. Congratulations to all for making this newsletter a reality!

”

VISION MISSION OF INSTITUTE

VISION

GITAM aims to be an outstanding Institute in India through academic excellence in the field of Technology and Management to fulfill the need of the Industry and serve the society.

MISSION

- To Provide healthy environment to our students as well as faculty members.
- To achieve excellence in technical education
- To promote holistic development of students through interaction with alumni, academia, Industry and expert lectures.
- To attract nurture and retain the best faculty and technical manpower.
- To promote research and development Initiatives.
- To contribute to the society by inculcating professional ethics in the students.

DEPARTMENT OF MECHANICAL ENGINEERING

VISION

“To become a center of excellence in the field of Mechanical Engineering, committed to address societal challenges and evolving needs of industry.”

MISSION

- To achieve excellence in mechanical engineering by providing outcome-based education in a healthy learning environment.
- To enhance the student’s technical and entrepreneurial skills by providing advanced learning facilities and co-curricular activities.
- To inculcate professional ethics, leadership qualities, and moral and social values among students through interaction with alumni and experts from industry and academia.
- To encourage students to research and innovate through project works, workshops, conferences, training sessions, etc.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

- ⇒ **PO-1 Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ⇒ **PO-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.
- ⇒ **PO-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.
- ⇒ **PO-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.
- ⇒ **PO-5 Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitation.
- ⇒ **PO-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.
- ⇒ **PO-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.
- ⇒ **PO-8 Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- ⇒ **PO-9 Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- **PO-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.
- **PO-11 Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply the set to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.
- **PO-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.

PEO (PROGRAMME EDUCATIONAL OUTCOMES)

The students will be able to:

- **PEO-1** To produce competent Mechanical Engineers, capable of applying the knowledge of contemporary Science and Technology, to meet the challenges in Mechanical and allied Engineering fields.
- **PEO-2** To prepare the Mechanical Engineering graduates to work in diverse fields in different capacities involving individual and teamwork.
- **PEO-3** To inculcate among the students a sense of ethics, morality, creativity, leadership, teamwork, and professionalism.
- **PEO-4** To instill in the students, the ability to take up innovative research projects and to conduct investigations of complex Mechanical Engineering problems using research-based methods.

PSO (PROGRAMME SPECIFIC OUTCOMES)

The students will be able to:

- **PSO-1** Solve the real life problems by integrating design, thermal and manufacturing areas of Mechanical Engineering.
- **PSO-2** Adapt to rapid changes in the field of Mechanical Engineering and excel in a multidisciplinary work environment.

ABOUT MECHANICAL ENGINEERING

“ The Department of Mechanical Engineering was established in 2010 with the aim to provide the best knowledge and environment to ensure complete success in whatever field the students choose. This Department is one of the key strength of the Institute. It is making very sincere efforts to produce excellent Mechanical Engineering graduates to meet the present day needs of organizations and the Industry. The experienced and dedicated faculties along with its excellent facilities provide the necessary resources to keep the students updated with the latest industrial trends. The department has created state-of-the-art infrastructure in terms of Workshops, Laboratories and other facilities. ”

PROGRAMME	DURATION	INTAKE
B.TECH MECHANICAL ENGINEERING	4 YEARS	90
B.TECH MECHANICAL ENGINEERING (LEET)	3 YEARS	09
M.TECH MACHINE DESIGN	2 YEARS	12
M.TECH MANUFACTURING AND AUTOMATION	2 YEARS	18

ABOUT ME MANUFACTURING COMPANY



CERTIFICATE COURSE

The Department of Mechanical Engineering conducted a five days certificate course on “SUPPLY CHAIN MANAGEMENT & LOGISTICS” from 14/12/2020 to 18/12/2020. Mr. Sumit Verma was the resource person of this interactive session.

Objective: The Supply Chain is to make product available to meet customer demand that includes delivery to the appropriate location, on time, in sufficient quantity. Supply Chain Management is focused on doing that in the most efficient and effective way.

Course Outcomes:

- Understand fundamental of Supply Chain Management Concepts.
- Apply knowledge to evaluate and manage an effective supply chain.
- Understand the foundational role of logistics as it relates to transportation and warehousing.
- Analyze and improve supply chain processes.



CERTIFICATE COURSE

The Department of Mechanical Engineering conducted a five days certificate course on “INDUSTRIAL ROBOTICS” from 07/12/2020 to 11/12/2020. Mr. Parveen Kumar was the resource person of this interactive session.

Objective: To develop student’s skills in kinematics analysis of robot systems, trajectory planning and robot control.

Course Outcomes:

- Demonstrate an ability to apply spatial transformation to obtain forward kinematics equation of robot manipulators.
- Demonstrate an ability to solve inverse kinematics of simple robot manipulators.
- Demonstrate an ability to obtain the Jacobian matrix and use it to identify singularities.



WORKSHOP ON “AUTOCAD”

A Workshop on “Auto CAD” was organized for students of the Mechanical department on 6th of Jan 2021. Mr. Aatishey (Assistant Professor, SRM) was invited as the expert.

Autocad is used to create computer aided designs or software applications including drafting & developing the application in both the 2D and 3D formats and providing the information to the application. Autocad provides tools to design the softwares used in the industry, architectures and project management.



After completing this session, participants will be able to:

- Demonstrate basic concepts of the AutoCAD software.
- Apply basic concepts to develop construction (drawing) techniques.
- Understand geometric construction
- Produce 2D Orthographic Projections
- Understand and demonstrate dimensioning concepts and techniques

EXPERT LECTURE ON “3D PRINTING & ADDITIVE MANUFACTURING

An Expert Lecture on “3D printing was organized for students of the Mechanical department on 12th of Feb 2021. Dr. Deepak Chhabra (Assistant Professor UIET, MDU) was invited as the expert.


3D printing is any one of many processes in which a part is additively created by introducing or bonding additional material. 3D printed objects can be geometrically complex and are ideal in a wide variety of manufacturing applications. Machines can cost anywhere from hundreds to millions of dollars and utilize a wide variety of technologies to print parts.



Dr. Deepak Chhabra explained various types of 3D printers, their working principle, the advantages and disadvantages of various printers and the variety of applications of 3D printers. The expert also demonstrated some 3D printed models. The curiosity among the students was at a very high level and they were quite excited to know more about this advanced technology. The students asked many questions and the expert answered them up to their satisfaction level and cleared all the doubts. After completing the Expert Lecture, the students were given a chance to see the one more live demo of 3D printing and also to see some 3D printed objects.

RESEARCH AT MECHANICAL ENGINEERING

A Statistical Method to Predict the Hardness and Grain Size After Equal Channel Angular Pressing of AA-6063 with Intermediate Annealing

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Abstract

Fine-grained metals and alloys with a homogeneous microstructure can be produced in bulk quantities using the equal channel angular pressing (ECAP) technique. In the ECAP process, improvements in desired properties and grain refinement depend on die geometry, number of passes, strain per pass, plunger speed, friction conditions, processing temperature, etc. In the present study, Al-6063 alloy cylindrical samples are processed by ECAP varying three critical parameters: die channel angle, number of passes, and intermediate processing temperature. Optical microscopy, electron back scattered diffraction, scanning electron microscopy, and transmission electron microscopy techniques are used for observing grain size and refinement, deformation patterns, the formation of precipitates etc. The main consequence of the thermomechanical effect is a reduction in grain size from micro to nano is observed. This transformation makes the material better, which shows outstanding promises on ECAP results. The developed material can be highly applicable in research as well as in the automotive industry.

Keywords Severe plastic deformation · Equal-channel angular pressing (ECAP) · Surface hardness · Microstructure · Statistical modeling

1 Introduction

Aluminum 6XXX alloys present an FCC crystalline structure—optimally combining thermal, mechanical, chemical, and electrical properties. These materials are widely used

small or ultra-fine grain parts without changing the dimensions of the bulk sample significantly.

The ECAP technique was originally developed by Segal in 1977 [7]. An extensive review of the principles of ECAP



PROGRAMMES OFFERED

M. TECH

B. TECH

B. TECH (LEET)

DIPLOMA

DIPLOMA (LEET)

MBA

MCA

BCA

BBA



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Approved by AICTE, New delhi and Recognized under Section 2(f) of UGC Act, 1956 &
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