# DEPARTMENT OF MECHANICAL ENGINEERING

## MECH GCONNECT
e-NEWSLETTER

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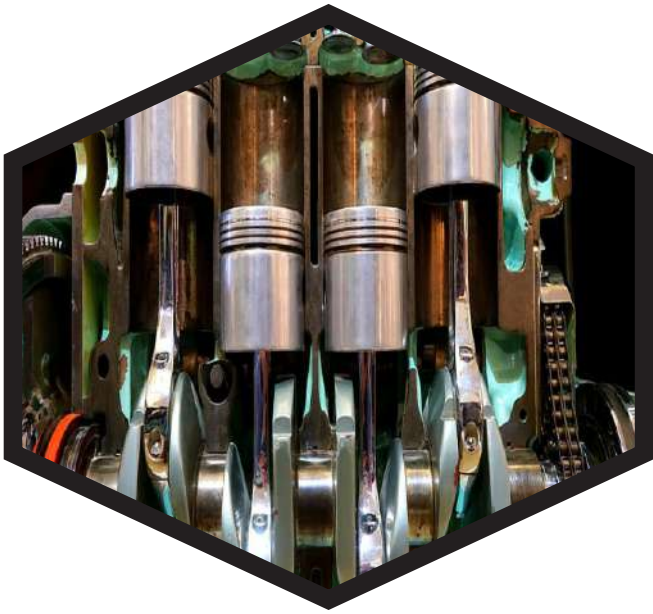


# GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA

# GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

## DEPARTMENT OF MECHANICAL ENGINEERING

# CONTENT

# Director's Message

**DR. AMAN AGGARWAL**

GITAM, KABLANA

"'Mech G Connect' (ME newsletter), vol.1 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 Institue 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 an 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 | 120 |
| B.TECH MECHANICAL ENGINEERING (LEET) | 3 YEARS | 12 |
| M.TECH MACHINE DESIGN | 2 YEARS | 12 |
| M.TECH MANUFACTURING AND AUTOMATION | 2 YEARS | 18 |

# ABOUT ME MANUFACTURING COMPANY

GAIL (India) Limited

motherson

ZECO

इंडियनऑयल

ओएनजीसी ONGC

सेल SAIL

Reliance Industries Limited

MARUTI SUZUKI

# CERTIFICATE COURSE

**The Department of Mechanical Engineering conducted a five days certificate course on "INDUSTRIAL ROBOTICS" from 30/09/2022 to 28/10/2022. Mr. Parveen Kumar was the resource person of this interactive session.**

**Objective: This course is designed 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.**


GITAM

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

Bahadurgarh-Jhajjar Road, Kablana (Jhajjar)

DEPARTMENT OF MECHANICAL ENGINEERING

Certificate

Head of Department

# INDUSTRIAL VISIT AT "EVEREST BLOWERS PVT LTD"

**Objevtive: The visit was organized by the college in M/s Everest Blowers Private Limited to provide basic knowledge of operation and experience the working environment of the production unit. So that students are capable enough to correlate the theoretical knowledge with practical knowledge.**



**The product range of includes:**

- **Twin & Tri Lobe Roots Blowers (Positive Displacement).**
- **Heli-Hybrid ® range of Helical Blowers for Energy Efficiency and Low noise..**
- **Gear-Less Turbo Blowers (Air Bearing Design).**
- **Integrally Geared Turbo Blowers for high volume and Differential pressure requirement.**

# INDUSTRIAL VISIT AT "MEDI PLUS INDIA LTD"

**Objective:** Purpose of visit was to provide an opportunity to the students to have real insight into Moulding processes and experience the working environment of the production unit. So that students will be able to compare their theoretical knowledge with the practical one.



**CONCLUSION:** This industrial visit will benefit the students in terms of learning working culture & various machining processes like Injection Moulding, Automatic Assembling and Design & Development. During plant visit, students passionately interacted with the workshop supervisor to learn all the basics of concerned processes and cleared their doubts. Overall it was nice and fruitful to visit MediPlus India Ltd.

# EXPERT LECTURE ON "3D PRINTING & ADDITIVE MANUFACTURING"

Expert Lecture on "3D printing" was organized for students of the Mechanical department on 20th of Oct 2022. Dr. Deepak Chhabra (Assistant Professor UIET, MDU) was invited as the expert.


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 of 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.

## EXPERT LECTURE ON "ERGONOMICS"

Expert Lecture on "Ergonomics in Design" was organized for students of the Mechanical department on 17th of Nov 2022. Dr. Sandeep Singh Kharb (Assistant Professor, Ch. Ranbir Singh State Institute of Engineering and Technology) was invited as the expert.


**Table of Content:**

- Ergonomics basics and its domains
- Design approach
- Elements of product design
- Ergonomics in machine tool design
- Ergonomics in m/c tool safety
- Ergonomic factors for advanced manufacturing systems
- Ergonomics problems in new technologies i.e. Industry 5.0

"The study of the physical interaction of workers with their tools, machines, and materials so as to improve the worker's performance while minimizing the risk of musculoskeletal disorders."

# EXPERT LECTURE ON "SOLID WORKS"

**Expert Lecture on "SOLID WORKS" was organized for students of the Mechanical department on 23rd of November 2022. Mr. Pankaj Bhatia was invited as the expert. Solid Works is a solid modeling computer-aided design (CAD) and computer-aided engineering (CAE) application published by Dassault Systems.**



**Objective:**

- **To Bridge the gap between Academic and Industrial Practice regarding 3D Modeling and Analysis in Design of components.**
- **To Explore Computer Aided Designing.**
- **To describe the fundamentals of Sketching, Part Modeling, Assembly, Detailing and Basic of Static Analysis.**
- **To make the participants aware about the concept of SolidWorks 3D modelling software.**
- **To provide experience to the participants making the topic more clear.**

**Course Outcomes:**

- **Mr. Pankaj Bhatia, explained basics of CAD and how to create a sketch, part, prepare assembly and detailing (drawing sheet work).**
- **Mr. Pankaj Bhatia, explained how to apply material to components, how to check mass properties in software. Also show one demonstration of static analysis on components.**

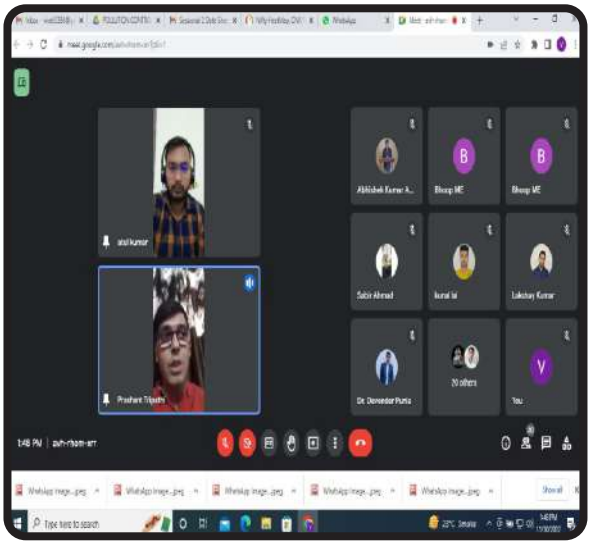
**After completing the lecture, the students were given a chance to ask doubts regarding Solid Works.**

## ALUMNI TALK

An Alumni Talk was organized for students of the Mechanical Engineering Department on 24th of November 2022. Mr. Satyam Sharma and Mr. Bashir Miya were invited for Alumni Talk. They interacted with the students and gave career guidance regarding higher studies and jobs in mechanical engineering field. The alumni provided course-specific information to the students.

**Objective:** Alumni talk helps the student to better understand their curriculum and the use of curriculum during their job. Alumni talks become an eye opener for the students on how to enter a company after completion of their course and use their skill for better performance.

## ALUMNI TALK



An Alumni Talk was organized for students of the Mechanical Engineering Department on 30th of November 2022. Mr. Prashant Tripathi and Mr. Atul Kumar were invited for Alumni Talk. They interacted with the students and gave career guidance regarding higher studies and jobs in the mechanical engineering field. The alumni provided course-specific information to the students.

**Objective:** Alumni talk helps the student to better understand their curriculum and the use of curriculum during their job. Alumni talks become an eye opener for the students on how to enter a company after completion of their course and use their skill for better performance.

## EXTENSION ACTIVITY ON "POLLUTION CONTROL AWARENESS PROGRAM"

**Hazardous air pollutants can affect human health in a number of ways including skin, throat and eye irritation, headaches, nerve and organ damage, and increased risk of cancers etc. This usually happens when the pollutants are breathed in over long periods of time as they can accumulate in our bodies. However some hazardous air pollutants can have a more immediate effect.**



**Under the program, we discussed about "How to control Pollution"**

1. **Using public transport.**
2. **Turn off the lights when not in use.**
3. **Recycle and Reuse.**
4. **No to plastic bags.**
5. **Reduction of forest fires and smoking.**
6. **Use of fans instead of Air Conditioners.**
7. **Use filters for chimneys.**
8. **Request Avoid usage of crackers.**
9. **Avoid using products with chemicals.**
10. **Implement forestation.**

## EXTENSION ACTIVITY ON "DIGITAL PAYMENT AWARENESS PROGRAM"

**An extension activity on Digital Payment Awareness Program was organized by Mechanical Department on 30.11.2022 at Govt. Senior Secondary School, Kablana. Knowledge about digital payments (i.e. what is digital payments, what are various modes of digital payments, benefits and losses) was shared with the students. For this activity Mr. Pardeep Kumar and Mr. Rinku from Mechanical Department were main speakers.**


**The students enjoyed a lot and gained knowledge about digital payments. At the last, a thanks note was given by Principal (Mr. Ajay Khokhar) to the department of Mechanical Engineering, GITAM, Kablana.**

## RESEARCH AT MECHANICAL ENGINEERING

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### Calculation for the Coefficient of Discharge through Venturimeter with help of Response Surface Method

**Parveen Lather[1], Vivek Khokhar[2]**

[1,2] *Mechanical Engineering Department, Ganga Institute of Technology and Management,Jhajjar, Haryana, India*

**Abstract** - Venturimeter is used to measuring the discharge through pipes. The ratio of the actual discharge to the theoretical discharge is called the coefficient of discharge. The coefficient of discharge is calculated experimentally with the help of experiments. Further, the design of experiment software is used for finding the optimum value of the coefficient of discharge. The response surface method is used for optimizing the appropriate value of the coefficient of discharge value. For finding the optimization the two factors; the total time taken (T) and Difference in manometer reading (X) are considered as a input value and

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### Finite Element Analysis and Optimization of Single Cylinder Engine Crankshaft for Improving Fatigue Life

Mr.Harneet Singh Sarna[1], Mr.Nitin Jain [2]

[1,2] *Maharshi Dayanand University, Ganga Institute of Technology & Management, Kablana, Jhajjar 124104, India*

***Abstract*— Crankshaft is large volume production component with a complex geometry in the Internal Combustion (ICE) Engine. This converts the reciprocating displacement of the piston into a rotary motion of the crank. An attempt is made in this paper to study improve fatigue life of single cylinder engine crankshaft with geometry optimization. The modeling of the original and optimized crankshaft is created using SOLIDWORK Software and was imported to ANSYS software for analysis.**

**Geometry optimization resulted in 15% stress reduction of and life is optimized 62.55% crankshaft which was achieved by changing crankpin fillet radius and 25.88% stress reduction of and life is optimized 70.63% of crankpin diameter change. Then the results Von-misses stress, shear stress and life of crankshaft is done using ANSYS software**

shaft, the force will be transmitted to the crankshaft. It must be strong enough to take the downward force of the power stroke without excessive bending, so the reliability and life of the internal combustion engine depend on the strength of the crankshaft largely. Section geometry changes in the crankshaft cause stress concentration at fillet areas where bearings are connected to the webs of the crank. In addition, these component experiences both bending and torsional load during its life service. Therefore, areas of filleted portion are locations that experience the most critical stresses during the service life of the crankshaft[3]. The typeof crankshaft depends on number of crankpins. Evaporator and large suction


## PROGRAMMES OFFERED

| | | |
|---|---|---|
| M. TECH | | B. TECH (LEET) |
| MCA | B. TECH | MBA |
| BCA | | BBA |

# GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

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