

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.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 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 “INDUSTRIAL ROBOTICS” from 15/11/2021 to 19/11/2021. 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.



CERTIFICATE COURSE

The Department of Mechanical Engineering conducted a five days certificate course on “SUPPLY CHAIN MANAGEMENT & LOGISTICS” from 13/12/2021 to 17/12/2021. 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.

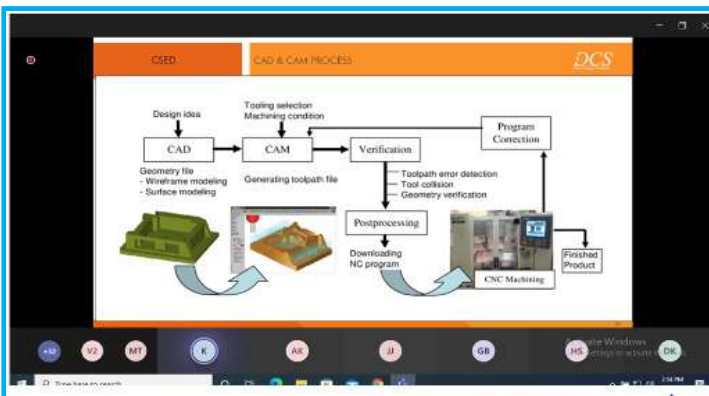


WORKSHOP ON “CAD/CAM”

Objective: This course is to teach the theory and tools of Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) with an emphasis on the central role of the geometric model in their seamless integration. It focuses on the integration of these tools and the automation of the product development cycle. It also covers the machining theory, automated CNC machining, and process control.

Course Outcomes after completing this course, participants will be able to:

- Explain the concepts and underlying theory of modeling and the usage of models in different engineering applications
- Create accurate and precise geometry of complex engineering systems and use the geometric models in different engineering applications.
- Compare the different types of modeling techniques and explain the central role solid models play in the successful completion of CAD/CAM-based product development.
- Use and assess commercial CAD/CAM tools efficiently, effectively and intelligently in advanced engineering applications.
- Extend CAD/CAM technology for research and development purposes.
- Explain the basic concepts of CNC programming and machining.



INDUSTRIAL VISIT AT "A.K. AUTOMATIC"

Objective: Purpose of visit was to provide an opportunity to the students to have real insight of gear manufacturing 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.



ABOUT A.K. AUTOMATIC: A.K. Automatics is one of the largest integrated automotive component manufacturers in India . It has 12 world class manufacturing facilities mainly located in North & West India. With the infrastructure and technology platform developed over 40 years, the Group is well positioned in the Indian Auto and Non-Auto component markets. With over 1600 various components, AK Automatic is mainly into the manufacturing of Transmission Gear Train Assembly, Kick Start Mechanism, Gear Shifting Towers & Forks, All types of Sprockets, Ratchets, Pinions, Special Engine Fasteners, Clutch Shafts, Armature Shafts, Spline Shafts, Balancer Shafts, Bearing Races & Rings, Fabricated Frames, 2-WHD Axles, Precision Ground Bushes and Special Turned Components. Moving with a growth rate of 11% CAGR, the company has posted a turnover of USD \$225 Million in the last year. AK Automatic mainly aims at expanding their business across the globes through technological excellence. We significantly feature **GOOD QUALITY, HIGH VOLUME & COMPETITIVE COST.**

PRODUCTS:

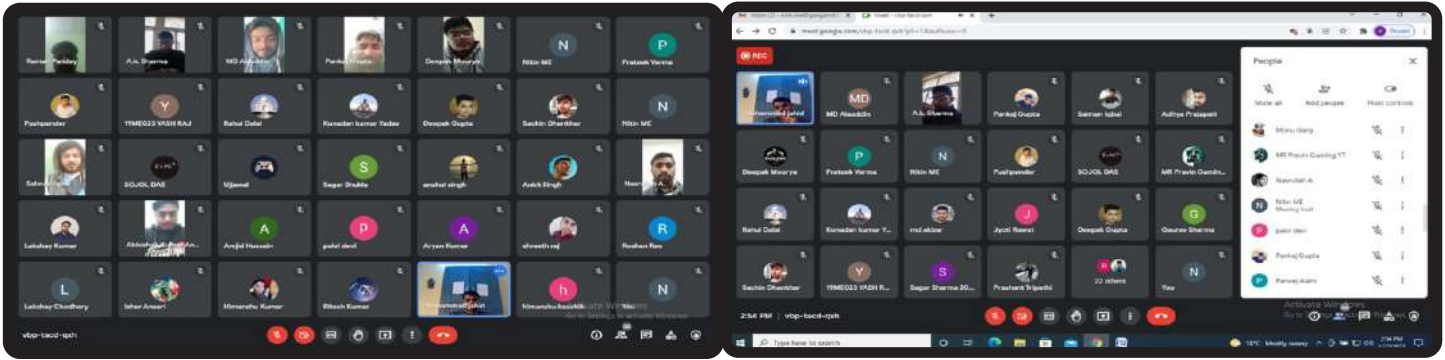
- A wide range of ground gears like spur and helical gears and transmission gears commercial vehicle are manufactured in the company.
- Standard products cover most of the international standards ISO, ANSI /ASME, BS, JIS, DIN etc. and are engineered as per respective standards.
- These standard products cover a very wide range of industries viz Automobile sectors, standard / special m/c building sectors etc.



CONCLUSION: This industrial visit will benefit the students in terms of learning working culture & various machining processes involved in making different types of gears. During the plant visit, students enthusiastically interacted with the workshop supervisor to learn all the basics of manufacturing processes and cleared their doubts. Overall it was nice and fruitful to visit the company.

ALUMNI TALK

An Alumni Talk was organized for students of the Mechanical Engineering Department on 27th of Jan 2022. Mr. Nishul was invited for Alumni Talk. He interacted with the students and gave career guidance regarding higher studies. The alumni provided course-specific information to the students. **Objective of Alumni Talk:** 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.



EXPERT LECTURE ON “ADVANCEMENT IN MANUFACTURING”

Objective: To increase the awareness of the Mechanical Engineering students about advancement in Manufacturing Processes. To aware the students about expectations of industries from fresher /graduates.

Some of the key objectives of advancements in manufacturing include:

- 1. Cost Reduction:** One of the primary objectives is to reduce manufacturing costs by optimizing processes, reducing waste, and improving resource utilization. This can involve automation, lean manufacturing, and supply chain optimization.
- 2. Quality Improvement:** Manufacturing advancements aim to enhance product quality and consistency. This can be achieved through better process control, improved materials, and stricter quality control measures.
- 3. Efficiency and Productivity:** Increasing efficiency and productivity is a central goal. This involves streamlining processes, reducing downtime, and improving the utilization of equipment and labor.
- 4. Innovation and Product Development:** Manufacturing advancements often enable the creation of new and innovative products. This can involve the development of new materials, product designs, and production techniques.
- 5. Flexibility and Customization:** Manufacturing advancements allow for greater flexibility in production, enabling customization and the ability to quickly adapt to changing customer demands and market conditions. with strict standards, is a key objective in manufacturing advancements.

Outcomes:

- 1. Cost Savings:** Reduced production costs lead to higher profitability and potentially lower consumer prices.
- 2. Improved Product Quality:** Enhanced product quality increases customer satisfaction and loyalty.
- 3. Increased Efficiency:** Improved efficiency results in quicker production, reduced waste, and increased resource utilization.
- 4. Innovation and New Products:** Manufacturing advancements lead to the creation of innovative products, driving market growth and competitiveness.
- 5. Customization:** The ability to customize products meets individual customer needs and preferences.
- 6. Environmental Benefits:** Sustainable manufacturing practices reduce the environmental footprint of production.



RESEARCH AT MECHANICAL ENGINEERING

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Compressive Force Analysis on Piston of Automatic Screw Jack Compression Dustbin

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Abstract - The spread of urbanization has happened very rapidly in a developing country like India. And the same amount of waste production has also increased. Efficiently managing waste is a huge problem and challenge for us. This paper outline efficient and effective approach to handling waste production. In this paper, Automatic screw jack compression dustbin is built on screw jack mechanism which operated by low torque motor using very high torque ratio belt and pulley linkage by which a very high compressive force achieved on the piston of screw jack and the motor is connected to an Arduino Uno board which consist of a microcontroller and the microcontroller circuited with the Ultrasonic sensor. The location of Ultrasonic sensor little lower from the topmost portion and opposite side of opening of dustbin. The microcontroller Arduino will be programmed such as when the dustbin full, the motor

top portion of dustbin which detect the level of waste and send signal to microcontroller which present on Arduino Uno, this Arduino Uno programmed in such a way that when the garbage full at dustbin the motor starts rotating the screw jack compression mechanism done and the garbage compressed by a heavy compressive force.

II. LITERATURE WORK

L Gogoi [1] Solid Waste Disposal and its Health Implications in Guwahati City 2012 This project based on Improper management of waste causes air pollution which affects our environment leading to many adverse effects on human health. In a paper published

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Design and Structural Analysis of Pick & Place Robotic Arm

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Abstract - Now days in this fast-growing industrial age every company needs speed in manufacturing to cope up with the customer's requirements. Every industrialist cannot afford to transform his unit from manual to semi-automatic or fully automatic as automation is not that cheap in India. The basic objective of our project is to develop a versatile and low-cost robotic arm which can be utilized in any industry to eliminate this problem. Our robotic arm can be used in number of applications by changing the program of controller and the structure is designed in such a way that it is capable to lift light loads but can also lift medium loads. Our robotic manipulator would be used mainly in the packaging department and automatic assembly lines. Mankind has always strived to give life like qualities to its artifacts in an attempt to find substitutes for himself to carry out his orders and also to work in a hostile

1. INTRODUCTION

1.1 Introduction of the thesis

Robotic structures are challenging because of the involving of dynamic forces. These dynamic forces further amplify themselves during emergency stop operation. Further a pick and place operation has its own operating frequency, if this frequency resonates with the structure it results in dramatic failure so a structure that supports such an operation needs to be stable both in static condition as well as in dynamic condition. The frequency analysis of the outer structure depends on the load by the pedestal and the robot which is totally mounted at the center. The main aim is to avoid the resonance occurrence between the

Identification of Critical Success Factors & Criteria's for the Employment of Six Sigma in Manufacturing Industries

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Abstract:- Six-Sigma Is A Philosophy Of Management Prepared And Developed By Motorola Company Which Aims At Setting The Topmost Goals, Collecting Data, And Analyzing The Results Efficiently As A Way To Decrease Defects In Services And Products. The Sigma (Greek) Letter Is Sometimes Used To Indicate Differences From The Norm. The Philosophy Or Principle Behind Sixsigma Is That If You Identify And Measure How Many Errors Are In The Process, You Can Find Out How To Eliminate Them As Systematically And As Equal To Perfection As May Possible. For A Company To Get Six Sigma, It Cannot Generate Greater Than 3.4 Defects Pm I.E. (Per Million) Opportunities, Whereas The Term Opportunity Is Defined As An Inconsistency. Index Terms – Six-Sigma, Csf (Critical Success Factors)



Fig.1 Benefits of Six Sigma

A Review on Solar Powered Electric Vehicle

Vijay Pratap ¹, Bhoop Singh²

^{1,2}Department of Mechanical Engineering

Abstract - Solar energy is a renewable energy source that will be around for thousands of years. In 2015, COP21 started the Paris Climate Conference 2015 in Paris in order to keep global warming below 2°C, and more than 190 countries agreed on climate cooperation. Several conditions were set forward at this meeting for developing countries such as India to reduce carbon monoxide emissions, which have a significant influence on road transport and improvement. The use of renewable energy, such as solar, in transport must be considered in order to reduce carbon monoxide emissions without delaying development. This is the research article on solar electric vehicles that was published in the study.

Index Terms - Solar, car, photovoltaic, electric.

INTRODUCTION

A solar vehicle is a type of solar vehicle used for ground transport. Solar cars often include regular

conductance at the time. Simultaneously, the most popular highest power point tracking approach is the same. The method for improving conductivity with the greatest precision is the best of all. It allows for the tracking of massive amounts of power. It keeps track of the maximum power point. It is obvious that the output voltage in the area where the constant current source works is different when changing the work voltage, the tolerance is low and the sensitivity at constant voltage is obvious in order to improve the tracking method, so that maximum power point tracking is accurate when temperature, light intensity and output power are definite.

Rattankumar, V, and N. P. Gopinath[2] No future fossil fuel exists since we conceived of the effective utilisation of non-conventional energy. We eliminate several of the disadvantages of conventional vehicles, such as reduced coupling losses, field losses, smooth speed handling, and fuel expense. The key

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Vehicle Pollution Crisis in India

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Abstract - Air great crisis in towns is mainly because of vehicular emissions. Owing to the expanding financial base Indian cities is growing at a faster charge. Transportation systems are growing everywhere and the improved era is inadequate to counteract growth. Over the years, vehicular traffic has increased multifold causing an associated increase in the total emissions from transportation sources. A survey has been carried out in Delhi to assess the fame of air pollution throughout the city and to see the dangerous gases emissions from vehicles which effects on our health and environment.

1.INTRODUCTION

Vehicular emissions are mainly the by-products of combustion of fuels within the vehicles engine combustion chamber and are released into the

Diesel emissions being very high in primary particulate matter emissions need to be controlled. Particulate matter (PM) is the term for solid or liquid particles found in the air. Mobile source particulate emissions consist mainly of fine particulates (PM_{2.5}) that are released directly and those that are products of secondary formation. These are very dangerous for our environment and especially for our health.

The pollutants cause problem when they react with the natural environment. When exposed to sunlight, hydrocarbons and nitrogen oxide create ground level ozone. Nitrogen lingers in the atmosphere and can cause acid rain and water pollution. Carbon dioxide is not only a deadly gas, but it also causes heat to be trapped in our atmosphere which causes the global warming. These negative effects become more and



PROGRAMMES OFFERED

M. TECH

B. TECH

B. TECH (LEET)

DIPLOMA

DIPLOMA (LEET)

MBA

MCA

BCA

BBA



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