KUMARAGURU
COLLEGE OF TECHNOLOGY

Department of Mechanical Engineering

Newsletter
MExpress

Vol. 04 Issue. 06

February 2021

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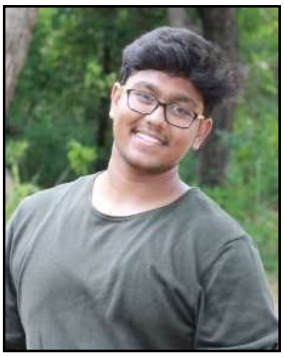
Dr. B. N. Sreeharan

Associate Editors:
Mr. Nitheeshwar R K
Mr. Praveen B
Ms. Rushethra P N

Associate Editor's Folio

IN SEARCH OF A DIESEL ENGINE

The automotive world is largely dependent on Diesel engines, the cars, trucks, and other locomotives are hugely relying on diesel engines. On the other hand, it is hardly seen motorcycles running on diesel engines, have you ever wondered why?? It is not like the industry has never seen Diesel engine motorbikes before, in fact in India motorcycle manufacturer like Royal Enfield had once introduced a diesel engine motorcycle- Taurus. The bike was designed on the platform of popular production variant of Royal Enfield, the Bullet.



Mr. Nitheeshwar R K
19BME067, II - B

When we talk about the Royal Enfield Taurus it was a motorcycle with diesel engine procured from Italian Lombardini. The single cylinder Lombardini diesel engine was essentially not made for automobiles. It was an engine popularly used in generators and other farming equipment. Royal Enfield did an experiment by mounting an unconventional diesel engine in the regular motorcycle mated to the OE drivetrain of Royal Enfield. The advent of Royal Enfield Taurus was happened by the company taken the idea from the people converting their regular RE Bullets into a diesel one by putting up aftermarket (usually used Lombardini) engines. Now Royal Enfield made available a brand-new motorcycle for those who want to get convert their Bullets into a Diesel engine bike. However, the higher maintenance cost and the reliability issue related to the Lombardini engines featured on RE Taurus soon outweighed the fuel economy stimulus.

Apart from Royal Enfield's half-hearted and failed experiment I do not reckon any other two-wheeler manufacturer ever tried their hands-on Diesel engine motorcycles in India. However, internationally there are lots of motorcycles still manufactured on the diesel engine platform. In fact, the US defence has included a whole fleet of diesel motorcycles in recent times. The motive behind accepting the diesel motorcycles for the US armed forces is purely based on strategical tactic.

But the question remained unanswered is why the diesel engine motorcycles are not popular despite of the advantage of the fuel availability. The answer lies into the mismatch of the demand and the cost premium of the diesel engine manufacturing. The robust diesel engine needs to be manufactured with increased manufacturing cost. Apart from the sturdy nature of the diesel engine the specialized fuelling system is also contributes to the increased manufacturing cost. As opposite to the petrol engines the diesel engines are devoid of spark plug assisted ignition system, it requires more like a fuel injected system for fuelling that has sort of auto ignition feature and it lacks the spark to get the fuel ignited. This specialized fuelling system for typical diesel engines adds a substantial cost to the overall manufacturing cost. The increased cost of manufacturing will be passed on to the customers hence they will be directly affected by it. It is often seen that the benefit of the fuel efficiency associated with the diesel engines gets neutralized by the additional amount paid by the customer on the diesel bikes and the cost of maintenance incurred by them. The roughness of the diesel engines is also compared with the smoothness of a petrol engine, which increases with the reduced number of cylinders. It is said that as you bring down the number of cylinders used in a diesel engine, the roughness and the vibrations get increased to an intolerable level. And as an irony to get the maximum benefits of a frugal diesel engine you need to develop it with as low as single cylinder engine, which is a quite nasty job any engine development team. So, now as you know why we do not see diesel engine motorcycles as commonly as petrol engine bikes.

Departmental Activities

Programmes Organized

- A Hackathon "Solutionathon" were organized by the department under Mechanical Engineering Association from 15-10-2020 to 08-01-2021.

Dr. V R Muruganantham, ASP and **Mr. M A Vinayagamoorthi**, AP (II) coordinated the event.

Value Added Courses

Mr. R. S. Mohan Kumar, Assistant Professor – I and Dr. A. P. Arun, Assistant Professor – II handled a Value-Added Course on "Product Design and development" during 01-01-2021 and 10-01-2021 for the third-year students.

Papers Presentations

Dr. M. Balaji, ASP presented a paper entitled "Contemporary Challenges of Mathematical Analysis in Project Management" in the International Conference on Advances in Mathematical Modeling organized by PSG College of Technology, Coimbatore conducted between 07-01-2021 and 09-01-2021.

Papers Submitted

Following faculty members submitted their papers for getting published in Scopus indexed journals.

- **Dr. K. K. Arun**, AP (III)
- **Dr. K. Krishnamoorthi**, AP (II)
- **Mr. V. Manivelmuralidhan**, AP (II)

Papers Publications

Mr. S. Sivakumar, AP (II), and **Dr. C. Velmurugan**, Professor & HoD published a paper titled "Effect of nano cupric oxide coating on the forced convection performance of a mixed mode flat plate solar dryer" in the Journal of Renewable Energy, Volume 155, August 2020, Pages-1165-1172 https://doi.org/10.1016/j.renene.2020.04.027.

Departmental Activities

Dr. K. M. Senthilkumar, Associate Professor published following papers:

- "Multi-objective optimization on output responses for micro ECM of Al6063 alloy, silicon carbide and boron glass powder metal matrix composites", in ther International Journal - Materials Today Proceedings, Science Direct, https://doi.org/10.1016/j.matpr.2020.11.130.

- "Characterization of Friction Stir Welded AA1100 Aluminium Alloy for High Temperature Application", in the International Journal Solid State Technology, Vol. 63 No. 5. http://solidstatetechnology.us/index.php/JSST/article/view/6659

- Effective Model for Vendor Selection and Allotment of Order Quantities in Agile Supply Chain for Multiple Products and Multiple Suppliers in Manufacturing Industries

- pH Monitoring System – An Innovative Tool for Semi-organic Dyeing Process used in Industries

in the International Journal Solid State Technology.

Dr. V. Muthukumaran, Professor published three papers as detailed below

1. "An Effective Model for Vendor Selection and Allotment of Order Quantities in Agile Supply Chain for Multiple Products and Multiple Suppliers in Manufacturing Industries"
2. "pH Monitoring System – An Innovative Tool for Semi-organic Dyeing Process used in Industries"
3. "Therapeutic effects of purified polyphenols from Coccinia grandis: correlation between hypertension and diabetes mellitus"

in the International Journal Solid State Technology.

Dr. S. Bhaskar, Associate Professor, published a paper titled "Enhancing overall labour effectiveness of CSD warehouse by adopting lean tools in construction equipment manufacturing process" in the National Journal Industrial Engineering Journal. (Vol. XIV & Issue No. 12 January – 2021).

Patent Publication

Dr. A. P. Arun, Assistant Professor – II and **Mr. R. S. Mohankumar**, Assistant Professor published a patent titled "A Smart Dustbin For Disabled People", Patent No. 202141001895 A.

Departmental Activities

Papers Reviewed

Dr. C. Velmurugan, Professor and HoD reviewed a paper titled “Fabrication of diamond particle reinforced Al matrix composites by liquid-solid separation process” for the International Journal of Materials Processing Technology.

Dr. B. Senthilkumar, Associate Professor reviewed a paper titled “Fabrication and testing composite materials” for the International Journal Measurement.

Dr. P. S. Samuel Ratna Kumar, Assistant Professor reviewed the following papers in the respective WoS / Scopus indexed journals as mentioned thereof.

- “Optimization of Cellulase-assisted Extraction and Antioxidant Activity of Polysaccharides from Taraxacum Mongolicum Hand.-Mazz” IOP Conference series: Material science and engineering
- "Optimization of Solar Tunnel Dryer for mango Slice using Response Surface Methodology" Materials Today: Proceedings
- “Influence of Tool Profiles on Similar Al-5083 Alloys Using Friction Stir Welding” Materials Today: Proceedings
- “Arena modeling and simulation analysis of Start-up India initiative” Materials Today: Proceedings

Ph. D. Completed

Mr. T. Karuppusamy, AP (II) has successfully completed the oral examination held on 29-01-2021 for the award of Doctoral degree under the Faculty of Mechanical Engineering. The Doctoral degree awarded by the Anna University Chennai is in compliance of UGC Regulations 2009.

Book Chapter Publications

Mr. R. S. Mohan Kumar, Assistant Professor and **Dr. A. P. Arun**, Assistant Professor – II published a book chapter titled “A Detailed Study on Design and Fabrication of an Efficient Handling Water Weed Removing Machine, in the Book ‘Recent Developments in Engineering Research’ published by Book Publisher, India West Bengal, India 978-93-90149-67-4(Print) 978-93-90149-19-3

Departmental Activities

Awards Received

Dr. C. Velmurugan, Professor & HoD received Academic Excellence - Head of the Department Award on 16-01-2021 from Fr.C. Rodrigues Institute of Technology, Vashi, Mumbai in Association with Institution of Engineers India

Mr. M. A. Vinayagamoorthi, Assistant Professor – II received ELITE – GOLD award on 13-01-2021 from NPTEL.

Dr. S. Balasubramanian, Associate Professor, received IIC-Innovation Ambassador award on 05-01-2021 from IIC- MHRD.

Proposals Submitted

Dr. C. Velmurugan, Professor & HoD along with **Dr. B. Senthilkumar**, Associate Professor submitted a proposal on MODROBS - Modernization of Dynamics Laboratory to AICTE.

Dr. S. Sivakumar, Assistant Professor – III submitted a proposal titled "220 V DC-5 kWh – Inverterless Direct DC-Power Supply Through Solar With Lithium Ion Battery Storage System for rural household" in National Innovation Challenge for Designing and Developing Energy Storage System for Rural Households for the Department of Science and Technology Ministry of Science and Technology Government of India

He also submitted a proposal to Tamilnadu state council for Science and Technology in the title "Design and Experimental Analysis of Wireless energy transfer system for Dynamic charging of Electric Vehicles".

Mr. M. A. Vinayagamoorthi, Assistant Professor – II submitted a proposal to Tamilnadu state council for Science and Technology with the titled Design of Tilting Fog Lamps in Light Motor Vehicles.

Departmental Activities

Industry Linkages

Mr. R. S. Mohankumar, Assistant Professor and **Mr. M. A. Vinayagamoorthi**, Assistant Professor – II visited M/s. Unitek Hydraulics for the purpose of Product Development Opportunities Identification, Faculty Training Opportunity Identification, Students Internship and Industrial Training Opportunity and for Identifying technical problems faced by the industry in the process.

Online Courses / Programmes attended / participated / completed

Mr. S. Sivakumar, AP-II participated in National Level ATAL FDP on "Productivity Enhancement Through Personal Excellence" from 25-01-2021 to 29-01-2021.

Mr. R. S. Mohan Kumar, AP-I completed a NPTEL course in "Design thinking -A primer" from 12-10-2020 to 01-10-2020.

Mr. M. Thirumalaimuthukumaran, AP II participated in a Webinar on "Significance of Structural Stress Analysis and Test Validation in Airframe Design and Development", Organized by Department of Aerospace Engineering, SRM Institute of Science and Technology in association with The Aeronautical Society of India, Chennai branch and Bangalore Aircraft Industries Limited on 21.01.2021 at 6.00 PM.

He also participated in another webinar on "Applications and use of the AI and ML in Robotics", conducted by SRM, Chennai from 28-01-2021 to 28-01-2021.

Mr. M. A. Vinayagamoorthi, Assistant Professor - II participated in a webinar on "Applications and use of the AI and ML in Robotics" from 28-01-2021 to 28-01-2021

He also participated in AICTE arranged a special lecture titled "Leadership skills of Shri Krishna and its relevance to youth and leaders today" from 01-01-2021 to 01-01-2021.

Mr. K. Manikanda Prasath, AP 1 participated in a webinar on "Application of Financial Modeling" from 22-01-2021 to 22-01-2021.

Departmental Activities

Mr. B. Jeeva, AP-I pa rticipated in National Level ATAL FDP on “Productivity Enhancement Through Personal Excellence” from 25-01-2020 to 29-01-2021.

Dr. V. Manivelmuralidaran, AP II participated in Five Days Faculty Development Programme on ”Advances in Materials and Manufacturing Engineering” organized by Department of Mechanical Engineering in association with ISTE Faculty Chapter of SMVITM from 28-12-2020 to 01-01-2021. He also completed two NPTEL courses on “Ergonomic Workplace Analysis” from 18-12-2020 to 18-12-2020 and on “Advanced materials and Processes” from 09-12-2020 to 19-12-2020.

Dr. S. Bhaskar, ASP completed online NPTEL course on “Teaching and Learning in General Programs (TALG)” – Sep/Oct 2020 (4 weeks) from 01-09-2020 to 01-10-2020

Dr. S. Balasubramanian, ASP completed a NPTEL course in “Design thinking -A primer” from 12-10-2020 to 01-10-2020. He also participated in the following webinars

- “Design of Experiments” organised by KGISL, Coimbatore from 11-01-2021 to 11-01-2021
- “Orientation 2021 NISP”, organised by IIC-KCT from 29-01-2021 to 29-01-2021
- “National Education Policy 2020”, NISP, organised by IIC-KCT from 30-01-2021 to 30-01-2021
- “Safety in Thermal Cutting System”, organised by Messer Cutting Systems India from 30-01-2021 to 30-01-2021

Dr. R. Manivel, Professor participated in AICTE UKIERI Leadership Development Programme organised by AICTE and UKIERI from 30-07-2019 04-12-2019 to 2-8-2019 07-12-2019.

He also participated in Webinar on “Implementation of National Education Policy (NEP)-2020” from 30-01-2021 to 30-01-2021.

Dr. P. Sathyabalan, Professor participated in webinars on Automation Studio - Design & Simulation of Electro-pneumatic circuits from 27-01-2021 to 27-01-2021 and on “Implementation of National Education Policy (NEP)-2020”, KCT from 30-01-2021 to 30-01-2021

Departmental Activities

Dr. N. Sangeetha, Sr. ASP participated in Online FDP on "Capacity Building of Women in Higher Education" from 2021-1-25 to 2021-1-29 from 25-01-2021 to 29-01-2021.

She also participated in a webinar on “National Education Policy, 2020”, NISP, organised by IIC-KCT from 30-01-2021 to 30-01-2021.

Dr. M. Balaji, ASP completed online NPTEL course on “Ergonomic Workplace Analysis” from 18-12-2020 to 18-12-2020

Dr. K. Ulaganathan, AP III participated in a webinar on “National Education Policy 2020”, NISP, organised by IIC-KCT from 30-01-2021 to 30-01-2021.

Dr. K. M. Senthilkumar, ASP participated AITCE ATAL FDP on "Robotic Process Automation: Tools and Techniques" from 01-04-2021 to 01-08-2021.

Dr. K. K. Arun, AP III completed an online Coursera course on “Learning How to Learn: Powerful mental tools to help you master tough subjects” on 01-02-2021.

Dr. T. Karuppusamy , Assistant Professor - II completed online NPTEL course on “Teaching and Learning in General Programs (TALG)” – Sep/Oct 2020 (4 weeks) from 01-09-2020 to 01-10-2020.

Dr. B. N. Sreeharan, Assistant Professor - II participated in webinars on “Formability of Steels from 01-04-2021 to 01-04-2021 and on ”Digital Tools to develop Communication Skills from 22-01-2021 to 22-01-2021. He also participated in a seminar on “Benchmarking Quality Enhancement Initiatives through Innovative Practices” from 01-09-2021 to 01-09-2021. Further he also completed an online NPTEL course on “Teaching and Learning in General Programs (TALG)” – Sep/Oct 2020 (4 weeks) from 01-09-2020 to 01-10-2020.

Internships Arranged

Dr. S. Balasubramanian, Associate Professor arranged internships for the students as detailed. **Mr. S. Pradeep, Mr. M. Nishanth and Mr. D. Vishnu Prasad** of **final year** in M/s. Indmace Engineering, Peelamedu, Coimbatore, from 08-01-2021 to 12-01-2021. **Mr. S. J. Sricharan and Mr. Rishya Shri** of third year in M.s. Unitek Hydralics, Coimbatore from 07.01.2021 to 13.01.2021.

Departmental Activities

SOLUTIONATHON

The review was organized cordially with Ré, along with an executive from Ré guided the students to help them fine tune their innovations and solutions to the problems they solved. Four reviews had been held and the students were made to ideate and form a solution for their problem statement. The solutionathon event was conducted for the past 18 weeks by Mr. Joshua Peter A. Every year the MEA Students organize these events for the knowledge enhancement of the students.

Finally, Results had been announced on the solutionathon valediction event based on the scores they have obtained. Among these three finalists, team Nerd Squad was announced as the winner & team Technocrats as runners.

Members of the team Nerd-Squad (Winners)

- Suriya Prakash S K - 19BEC112
- Raaj Khishorre K R - 19BME012
- Manav R Samant - 19BME006
- Brijesh Chandra Aksharan K - 19BEC107

Members of team Technocrats (Runners)

- Nitheeshwar R K - 19BME067
- Aswin Baalaje R - 19BME069
- Tharun J - 19BME068
- Idhaya Raja - 19BME072
- Thiruchitrambalam - 19BME066

The Mechanical Engineering Association (Faculty Coordinator: Dr. V. R. Muruganantham & Mr. M. A. Vinayagamoorthi) organized a Solutionathon Valedictory Function on 27th January 2021 for our Students. Total 7 teams participated in which each team had 5 team members of various departments involved in this event actively, in that three teams were approaching near the final solution. The faculties who had reviewed the three finalists in Solutionathon event are Mrs. Syed Ali Fathima, Mrs. Sabitha, Mr. Sivaguru.

Students Achievements

NCC:

Mr. Ilavarasan – 18BME141, have displayed a keen sense of loyalty, integrity, and devotion as a NCC Cadet and performed exceptionally well in RDC – 2020 held at New Delhi from 28th December 2019 to 01st February, 2020. He also attended a total of 13 Camps of each 10 days for training and selection.

IEI Awards:

Mr. Kritikesh.M. P – 18BME015, 3rd year of our department has been recognised for his research excellence (UG Nationals) by Institute of Engineers India (IEI). At recent times he has owned the patent for his own designed kitchen waste management system, he has also published two papers on solar powered autonomous vehicle for green campus drive & alternative and renewable energy sources topics respectively. He is also well known for his academic excellence, as he is a recipient of Mahatma Gandhi Merit scholarship award for the two consecutive Academic years (2018-2020) received from Kumaraguru College of Technology for having obtained highest score in academics.

Mrs. Rushethra P. N – 17BME080, 3rd year of our department has recognised for her academic excellence (UG Nationals) by Institute of Engineers India. She has attended various international conferences and presented more than three papers related to material sciences. She is one among the active participants in all our department activities and won many prizes. She is a wonderful Tamil Poet recognised in many competitions. She is also one among the precipitants of Mahatma Gandhi Merit scholarship award for the three consecutive Academic years (2017-2020) received from Kumaraguru College of Technology for having obtained highest score in academics.

Placement Section

Mr. Rushethra P N – 17BME080:

I am Rushethra from final year. I have got placed in three companies such as Infosys, TCS and CTS. It was very easy to crack these rounds and to get placed in these service companies. Let me share my experience in getting placed in these companies.

The first company I got placed was Infosys. This company's placement had two rounds. The first round had three sections. The first section was attitudes on Logical, Verbal, and quantitative. The second section was Pseudocode, A kind of algorithm-based questions and the third section was Essay writing which was really an important section in this round. The essay writing was an important section which was mainly to check our English writing skills. I got selected on round-1 and the second round was an interview. Interviewers had kept my resume in front of them and they asked me questions based on my resume and my interest.

The second company I gave a try was TCS. I had 4 sections in round 1. The first section was a game based on programming. It was an India wide game. A kind of a pool drive. The second section was aptitudes and the third section had questions based on basic programming of all the languages and the last section was Essay writing to check our Writing skills. I had 3 hours to complete round-1. Each section had a particular time in which I had to complete within that time. The result of round-1 had been sent to our mail and It was even available in their website. In round 2, There were 3 interviewers (HR, Coding Technical person, and a Mechanical technical person). HR had asked me basic questions regarding my career and interest. Coding tech had asked me questions on basic programming languages. Mechanical tech had asked me the course which I am interested in mechanical domain and asked me questions based on it.

The third company was CTS. It had Aptitudes and Automata fix coding which was a kind of error spotting. I got nearly about 60 questions in round 1. Round-2 was an interview with the HR and the interviewers. HR had asked me basic questions about their company and all about me. I said them that my favourite course was engineering thermodynamics and so they asked me few questions related to it. The interviewers had asked some basic technical questions too.

All the Best!

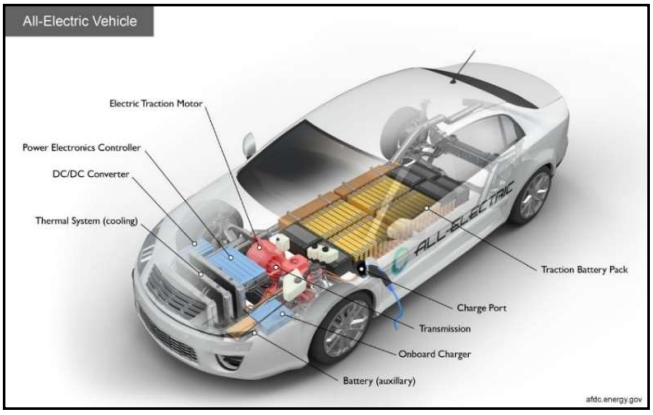
E-Mail: rushethra.17me@kct.ac.in

THERMAL MANAGEMENT OF EV

PADRINARAYANAN R
19BME010
II Year Mechanical - A

Heat is an important factor in the field of automobiles, engines as well as in E Vehicles. Utilizing it efficiently leads to the foundation for the automobile. Electric vehicle consists of battery which stores the electric energy, motor that converts electrical energy into kinetic energy and the control unit which plays the vital role in the mechanism of vehicle. Due to continuous discharging and energy flow, majority of heat is generated in batteries and motor. The heat can be extracted in two ways i.e., direct cooling and indirect cooling.

Direct cooling is an effective process. It can be carried out by immersing fluids with battery cells and motor coils, but possible with high risk factor of short circuit. In commercial vehicles, direct cooling is still common today Indirect cooling helps in ventilation and heat extraction but in a slower pace. Indirect charge air coolers are used only in combination with two-stage charging concepts. Such an indirect cooling system has significant benefits in commercial vehicles with single stage turbocharging systems. Advancements made in electric vehicle batteries allows to deliver more power and required less frequent charges. one of the biggest challenges for battery safety is the capacity to design an active cooling system.



Since electric vehicles has become popular, there is a high demand for longer battery life and higher power output. To achieve this, the battery thermal management systems need to be able to transfer heat away from the battery pack as they are charged and discharged at higher rates. Due to the high stress and temperatures generated by the batteries, there is even higher importance on having the correct coolant and additive package.

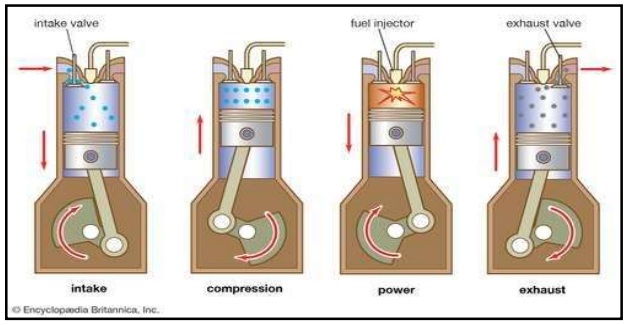
So, just like heat engine vehicles even EVs would go through development and refinement. At the end of the day a common man's question about a vehicle is "Kitna Deti Hai?"

COMPRESSION-IGNITION ENGINE

We all know that the diesel engine plays a vital role in day-to-day life. For example, if you want to travel somewhere or to carry the goods from one place to another place, the vehicles like cars, buses, trucks etc are used. Mainly these vehicles use diesel as the common fuel. Diesel engine, any internal-combustion engine in which air is compressed to a sufficiently high temperature to ignite diesel fuel injected into the cylinder, where combustion and expansion actuate a piston. It converts the chemical energy stored in the fuel into mechanical energy, which can be used to power freight trucks, large tractors, locomotives, and marine vessels. A limited number of automobiles also are diesel-powered, as are some electric-power generator sets.

SUVAN RAJ R
19BME100
II Year Mechanical - B

The diesel engine is an intermittent-combustion piston-cylinder device. It operates on either a two-stroke or four-stroke cycle. Diesel engines are typically constructed with compression ratios in the range 14:1 to 22:1. Both two-stroke and four-stroke engine designs can be found among engines with bores (cylinder diameters) less than 600 mm (24 inches). Engines with bores of greater than 600 mm are almost exclusively two-stroke cycle systems



The typical sequence of cycle events in a four-stroke diesel engine involves a single intake valve, fuel-injection nozzle, and exhaust valve, as shown here. Injected fuel is ignited by its reaction to compressed hot air in the cylinder, a more efficient process than that of the spark-ignition internal-combustion engine. Diesel engine fuel-injection systems are typically designed to provide injection pressures in the range of 7 to 70 megapascals (1,000 to 10,000 pounds per square inch). There are, however, a few higher-pressure systems.

There are three basic size groups of diesel engines based on power—small, medium, and large. The small engines have power-output values of less than 188 kilowatts, or 252 horsepower. Engines in automobile and trucks. Medium engines have power capacities ranging from 188 to 750 kilowatts, or 252 to 1,006 Horsepower. E.g., Engines in heavy duty trucks. Large diesel engines have power ratings in excess of 750 kilowatts. Engines in marines, locomotives and mechanical drive engines. Diesel engines are often turbocharged and aftercooled. Addition of a turbocharger and aftercooler can enhance the performance of a diesel engine in terms of both power and efficiency. Its compression ratio is high this it leads to high efficiency.

The principal drawback of diesel engines is their emission of air pollutants. These engines typically discharge high levels of particulate matter (soot), reactive nitrogen compounds (commonly designated NOx), and odour compared with spark-ignition engines. Consequently, in the small-engine category, consumer acceptance is low.

THE PATH TO SUCCESS

What Do Mechanical Engineers Do?

If you are an aspiring mechanical engineer or a budding mechanist who wants to take your career to the next level, it's important to know what to expect in your daily routine on the job. As a mechanist, your duties may also involve designing and building mechanical devices. Research is often an important part of the role of mechanical engineers too.

Kishore Krishna S
19BME013
II Year Mechanical - A

What Skills Do Mechanical Engineers Need for Success?

If you wish to lead a successful career path as an engineer, then it's important to develop key skills to help you achieve your goals and daily tasks.

For instance, Ohio State University alumnus Mathew Brady's job as a Mechanical Engineer at Amazon Robotics requires that he has a good understanding of engineering basics, make changes and put them into practice fast. He also needs to have technical skills to be successful in his roles, such as understanding how to use SOLID WORKS and good CAD modelling skills.

How Can Mechanical Engineers Achieve Success?

Here are some inspiring success stories from engineers:

Kate Gleason - As the first member of the American Society of Mechanical Engineers, Kate Gleason was known for being a mechanical engineering pioneer woman of her time. She was Cornell University's first female to study engineering. She also helped her father's company become one of the first manufacturers from America to expand its operations in Europe. She's also known for heavily promoting and improving the Gleason bevel-gear planer that her father helped develop.

Javier Ravines – Javier Ravines is a mechanical engineer and entrepreneur who runs a company that provides engineering services, including prototyping, research and development, testing and product development. But before Ravines dived into running his own company, he was able to achieve his success by getting a sound education from the HAMK Hame University of Applied Sciences. Ravines earned both his bachelor's and master's degrees in mechanical engineering and production technology at HAMK by 2011 and focused on laser technology for his graduate studies. His journey as an engineer and entrepreneur wasn't easy but it was worthwhile. He believes that any new student should focus on getting a sound education in the field, participating in clubs to help develop your career and to make use of the laboratories on campus.

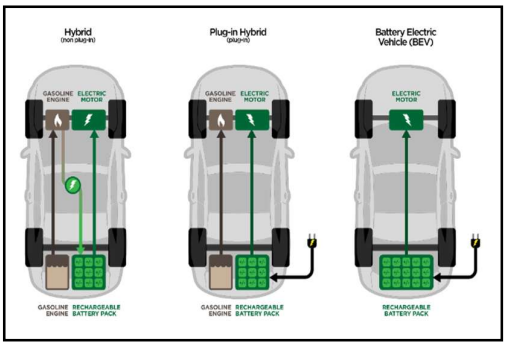
If you want to be a successful mechanical engineer, you'll need a plan. Luckily, you don't have to come up with one on your own. You can begin by using the tips and success stories of the engineers mentioned here as inspiration to craft your path to a successful engineering career. You can continue this pattern to your online and social networks, aiming to learn from other people's success stories.

INTRODUCTION TO ELECTRIC VEHICLES

The term "electric vehicle" refers to any vehicle that uses electric motors for propulsion, while "electric car" generally refers to highway-capable automobiles. Electric Cars are a type of Electric Vehicles. While an electric car's power source is not explicitly an on-board battery, electric cars with motors powered by other energy sources are typically referred to by a different name. An electric car using solar panel as a power source is a solar car, and an electric car powered by a gasoline generator is a form of hybrid car. Thus, an electric car that derives its power from an on-board battery pack is a form of Battery Electric Vehicle (BEV). Most often, the term "electric car" is used to refer to battery electric vehicles, but may also refer to Plug-in Hybrid Electric Vehicle (PHEV).

Ashwin Baalaje R
19BME069
II Year Mechanical - B

PLUG-IN HYBRID ELECTRIC VEHICLES:



Plug-in hybrid electric vehicles have both an internal combustion engine and electric motor. These vehicles are powered by an alternative fuel or a conventional fuel, such as gasoline (petrol), and a battery, which is charged up with electricity by plugging into an electrical outlet or charging station. The amount of electricity a PHEV can store in its battery can significantly reduce the vehicle's petroleum consumption under typical driving conditions.

HYBRID ELECTRIC VEHICLES:

Hybrid electric vehicles (HEVs) combine the benefits of gasoline engines and electric motors and can be configured to meet different objectives such as electric motor drive assist, Automatic start-stop, regenerative braking, improved fuel economy, increased power, or additional auxiliary power for electronic devices and power tools. HEVs run on fuel alone and do not plug in to an electrical outlet to recharge.

BATTERY ELECTRIC VEHICLE:

- A battery electric vehicle (BEV) or pure electric vehicle that exclusively uses chemical energy stored in rechargeable battery packs, with no secondary source of propulsion (e.g. Hydrogen fuel cell, internal combustion engine, etc.).
- BEVs use electric motors and motor controllers instead of internal combustion engines (ICEs) for propulsion. They derive all power from battery packs and thus have no internal combustion engine, fuel cell or fuel tank.

FUEL CELL ELECTRIC VEHICLES:

- Fuel cell electric vehicles (FCEVs) are powered by hydrogen.
- FCEVs use a propulsion system similar to that of electric vehicles, where energy stored as hydrogen is converted to electricity by the fuel cell.

ACTIVE SUSPENSION SYSTEM

Introduction: It is a type of an automotive suspension on the vehicle, which uses an onboard system to control the vertical movement of the vehicle's wheels relative to the chassis or vehicle body.

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Types: It is of two types: (1) Real active suspensions (2) Adaptive (or) semi-active suspensions

Principle: The principle is based on "Shyhook theory", which means 'The ideal suspension would let the vehicle to maintain a stable posture'. Here the active suspension uses the 'Actuator' to raise and lower the chassis independently at each wheel. Whereas the adaptive suspension only varies in 'Shock absorber' types to match the changing road or the dynamic conditions.

Active Suspension: Active suspensions are the ones which were first introduced, and they use separate actuators to exert an independent force to them to give a good riding quality. It also has drawbacks such as, high cost for designs, mass of the apparatus, frequent maintenance, and some other related minor problems which may be difficult to diagnose.

Hydraulic actuation: Hydraulic actuated suspensions uses the hydraulics. The hydraulic pressure is supplied by a 'high pressure radial piston hydraulic pump'. Sensors are placed to monitor the movement and vehicle ride level. After a few seconds it develops a counter force to raise or lower the body. It is also developed with "desirable self-leveling suspension and height adjustable suspension" which also helps in good 'Aerodynamic performance' by lowering the vehicle at high speeds.

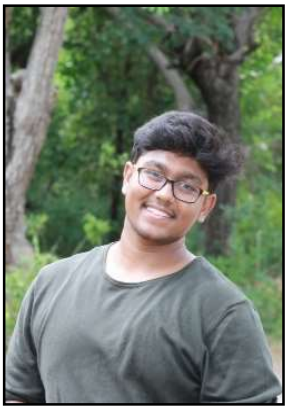
Electronic actuation of hydraulic suspension: This concept is actually to increase the cornering in racing cars. Sensors monitor the body movement and vehicle ride level and processes the data to the computer and as it receives the new data, it operated the hydraulic servos which is mounted behind each wheel. Instantly it develops the counter forces to body lean, dive and squat during the movements.

Adaptive (or) Semi Active Suspension: Adaptive or Semi-active systems are used to change only the "Viscous damping coefficient" of the 'shock absorber'. They have slow time responses. They are used to propose the driving modes like Comfort, Normal and Sport modes. They have certain advantages such as Less expensive, consumes less energy and some more compared to Active suspensions.

Solenoid (or) valve actuated: It is most economic and is the basic type of semi-active suspension. It consists of solenoid valve that alters the flow of the hydraulic medium, by changing the damping characteristics. They are wired to a computer which sends them the algorithmic commands. This type is used in CCR (Cadillac's Computer Command Ride) technique.

A NEW STAIN OF TESLA FOUND IN INDIA

"Two Indian friends together has found a new stain of tesla in Indian." I think this is a popular news in the automobile industry. Yes, veritably its true it is an Indian built electric car of higher performance and stylish design.



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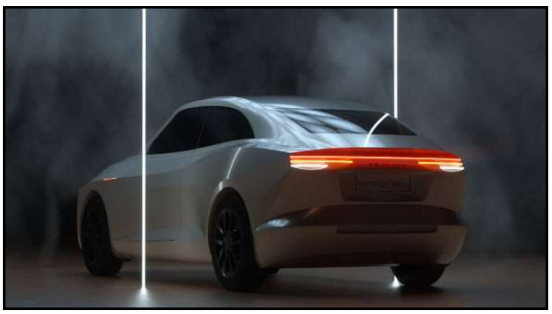
The car looks like a navigate of vintage Ford Mustang & Dodge Charger. Pravaig Dynamics, A Bangalore based electric mobility start-up, unveiled its Extinction MKI luxury electric coupe with some eye-popping specifications. The start-up claims that this two-door and four-seater electric car can run 504 km on a single tuition (battery range). Powered by a 96 kWh lithium-ion shower pack, the Extinction MKI generates an output of 200 restriction horsepower (bhp) with a top speed of 196 kmph. It can moreover slide from 0 to 100 kmph in just 5.4 seconds. **But the standout specification is the shower range of 504 km.** To put this icon into context, the Tesla Model Y Long Range has a shower range of a little over 508 km, while the Hyundai Kona claims 452 km per full charge. In India, the MG ZS EV (of MG Motor) claims 340 km, while the recently launched Mercedes-Benz EQC stands at 350 km.

The co-founder of Pravaig Dynamics Siddhartha Bagri says that, their pack is increasingly than double the MG ZS EV (powered by a 44.5 kWh shower pack). During testing, they have seen this icon goes whilom 600 km. They are unrepealable of the 504 km range. Developing a shower management system for these specifications is a massive challenge, keeping consumer safety in mind. They have spent a lot of blood, sweat and tears to make it safe, long-lasting and at the lowest forfeit possible. The shower pack consists of 5,000 cells located on the floor of the car. Their batteries with an energy density of 155Wh/kg and backed by world-leading safety standards allows them to maintain a significant range.

The start-up moreover claims that, the range of 504 km on a single tuition is performable in platonic conditions. "Moreover, we can tuition the shower pack from 0 to 80% in just 30 minutes. The lifecycle of the shower is well-nigh 10 lakh km.



Manufacturers can unquestionably make existing electric vehicles (EVs) travel longer distances on a single charge, but the problem is their batteries get overworked. What these batteries need are largest cooling systems. The trick lies in the diamond and execution of the cooling system. Technically, we can install a shower pack that allows you to reach these specifications, but what happens is we overwork the shower pack, which gets heated, and the subsequent

fuse that cuts off energy supply. We need an efficient cooling system in diamond and execution to ensure your EV can hit those specifications. For now, they use an 'active' cooling system that enables heat mart all withal the length of the shower pack. They're working on a couple of alternatives to this as well.

The co-founder of Pravaig Dynamics claims that **nearly 90% of the vehicle is completely built in India with upper standards.** Of course, there are unrepealable smaller high-value components they source from the weightier suppliers in the world, including those from Japan.

There are two billion fossil fuel-driven cars that need to be replaced with EVs in the next 10-15 years which offers massive throne room for their vendors to enter the global supply uniting in a major way and capture the market, with large swathes of the world transitioning to EVs. Unfortunately, there are unrepealable components that they have to rely on foreign vendors.

As they wanted to build their cars completely in our own mother land, they are in need of increasingly would-be vendors in India. So, they are currently educating vendors in our country and getting up to leading global metrics. Another unique facet of Pravaig's work on the Extinction EV is the adoption of 3D Printing. But, it's a very expensive process on an industrial scale, but it saves up a lot of time in the innovation process.

Usually, major global corporations prefer this expensive process on a commercial scale. It's laudable that in the name of innovation, Pravaig has unexplored 3D Printing. For any subsystem, companies often take four to five iterations surpassing it is robust and sound unbearable for commercial use. 3D Printing saves that time considering you don't have to wait for your supplier to make those necessary adjustments. Having said that, 3D printing is increasingly stuff explored wideness variegated areas of automotive production. Besides its standard use for rapid prototyping, this technology is moreover stuff utilised to produce tooling and, in unrepealable cases, end parts as well. But it's the merchantry model Pravaig Dynamics is proposing for the EV which could very well position the start-up for the future. Equal to the recent reports in the top automotive journals, Pravaig will not sell the car to private individuals.

"Instead, the visitor will lease the cars — withal with a suburbanite — to squadron operators. The thinking overdo it is that to recover the initial purchase price of EVs the cars need to be run continuously and thus take wholesomeness of low running costs. The 500km range is intended to see the car tackle multiple runs to the airport, in a municipality like Bengaluru for instance, and only needing to be charged overnight. Pravaig will moreover be installing chargers at the offices of the companies who have leased the car and their leasing financing will imbricate the forfeit of electricity consumed by the car," the report states.

As the start-up notes in a recent printing release, A premium taxi, the vehicles are built just for one single using of stuff a taxi. Therefore, they can provide scrutinizingly 40% reduced cost, versus comparable products with similar features.

However, it will not be the Extinction MKI that will wilt Pravaig's first commercial offering. It's imperative to note that this is a one-of-a-kind prototype that has laid the ground for Extinction MKII, a sedan.

Containing all the important technical specifications of the MKI, the MKII will see a series of significant upgrades for the end passenger experience, claims Pravaig.

So, why isn't the Extinction MKII for sale to individual consumers? Today, our cities are rife with traffic congestion and intense vehicular pollution, a future that isn't sustainable in the slightest. Making matters worse, equal to a recent study by the Delhi-based environmental think that [CENTRE FOR SCIENCE AND

ENVIRONMENT], “a car runs only for 400 hours on a stereotype in a year, and is parked the rest of the time (8,360 hours or 95%).”

Their objective is to ensure a person can commute from Point A to B most efficiently. Why do we want to superintendency well-nigh what car I want to buy, what charger do I use, how do I pay my EMI, maintenance costs, etc? For most car enthusiasts, the Extinction MKII may not offer the greatest satisfaction considering it’s not for sale to individual customers. But we are transitioning into a time where car ownership recedes. Today, 90% of the populace in Indian cities need a car considering they do not unbend them otherwise. This future is very likely to transpiration with greater accent on public transport and shared mobility. They are towering the tools to transition into that future.

MKI is Pravaig’s way of exhibiting the technical capabilities they can develop, whereas the MKII will have higher ground clearance, four doors instead of two, 165 degrees recline for the passenger seat and other features. It will retain the major specifications of the MKI, but will have increasingly upgrades for the weightier possible passenger wits globally.

Co-Founders Siddhartha Bagri and Dhawal Khullar

Slated for serial commercial production by Diwali next year, the start-up claims that they are well on undertow to unhook hundreds of new spare features, of which five standouts:

Private Space: Withal the lines of a limousine, this commercial vehicle will have a rollable tinted window dividing the front and rear seats, 12-inch mirrors and vanity lighting.
Office on Wheels: With a sedentary that can unbend a 15-inch laptop, power ports and two USB thunderbolt ports, commuters can work while they reach their offices.

Himalayan Air: The Extinction MKII will have an indoor air filtration system that clears out PM 2.5 at a rate of 99%, slantingly a CO2 filtration system, claims the start-up.

Opera on Wheels: Lowest power consumption with wool clarity and bass, the start-up claims that their vehicles will host the global automotive debut of the French audio trademark Devialet.

Built Like a Tank: The start-up claims that the production model will be a 5-star safety product. There is still a year to go surpassing Pravaig Dynamics really makes a major splash in the commercial EV space, but it is once breaking a lot of barriers with incredible specifications and an eye on the future, plane on subjects like data security.

Nonetheless, this isn’t something that has happened overnight. All this progress has been nine years in the making, overly since two friends Dhawal Khullar and Siddhartha Bagri established Pravaig Dynamics nine years ago.

They are now on the cups of a greater future.

KUMARAGURU
college of technology
COIMBATORE – 641 049

Department of Mechanical Engineering

INSTITUTE VISION:

The vision of the college is to become a technical university of International Standards through continuous improvement.

INSTITUTE MISSION:

Kumaraguru College of Technology (KCT) is committed to providing quality Education and Training in Engineering and Technology to prepare students for life and work equipping them to contribute to the technological, economic and social development of India. The College pursues excellence in providing training to develop a sense of professional responsibility, social and cultural awareness and set students on the path to leadership.

DEPARTMENT VISION:

To emerge as a centre, that imparts quality higher education through the programme in the field of Mechanical Engineering and to meet the changing needs of the society.

DEPARTMENT MISSION:

The department involves in sustained curricular and co-curricular activities with competent faculty through teaching and research that generates technically capable Mechanical Engineering professionals to serve the society with delight and gratification.

B. E. MECHANICAL ENGINEERING

PROGRAM EDUCATIONAL OUTCOMES (PEO's):

PEO 1 : Graduates will take up career in manufacturing and design related disciplines.
PEO 2 : Graduates will be involved in the execution of Mechanical Engineering projects.
PEO 3 : Graduates will take up educational programme in mastering Mechanical sciences and management studies.

PROGRAM OUTCOMES (PO's):

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.

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.
5. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
6. **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.
7. **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.
8. **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.
9. **Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
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.

PROGRAM SPECIFIC OUTCOMES (PSO's):

1. Apply the fundamentals of science and mathematics to solve complex problems in the field of design and thermal sciences.

2. Apply the concepts of production planning and industrial engineering techniques in the field of manufacturing engineering.

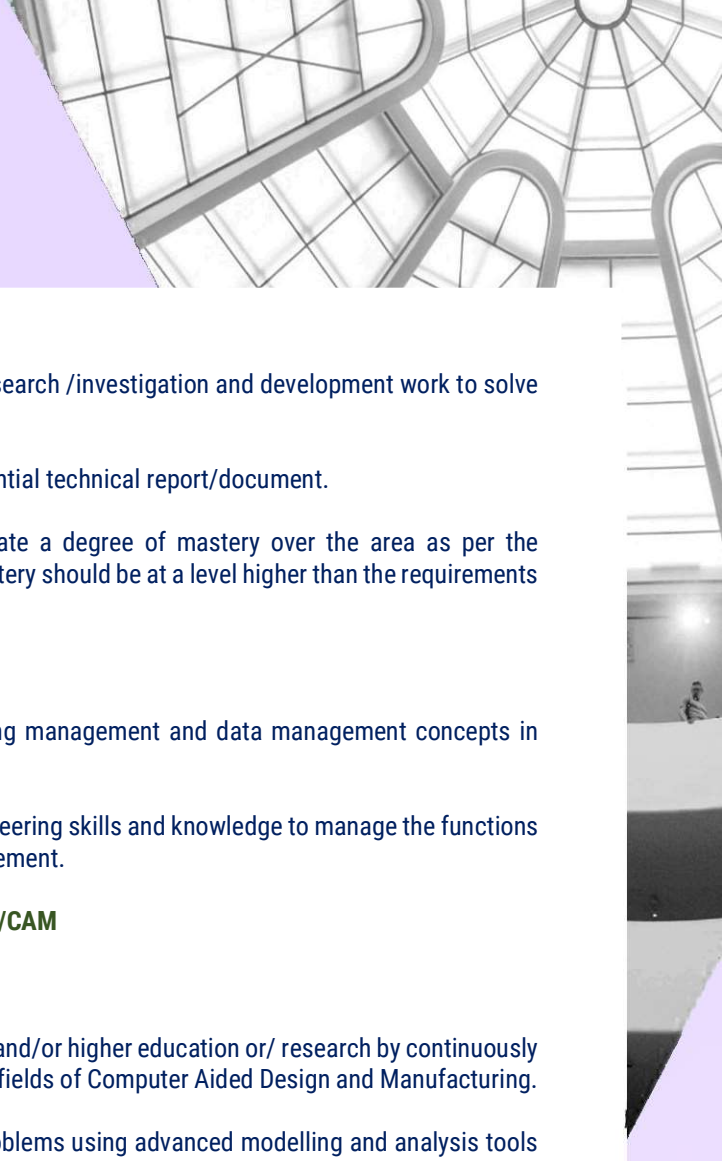
M. E. INDUSTRIAL ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES (PEO's):

PEO 1 : Graduates will be mid to higher level management / engineering professionals with responsibilities in engineering management, data analysis and business operations.

PEO 2 : Graduates will be engineering professionals, and technology leaders who would manage such functions as plant engineering, production, supply chain and quality management.

PEO3 : Graduates would function as educators or researchers in academic institutions.



PROGRAM OUTCOMES (PO's):

PO1 : An ability to independently carry out research /investigation and development work to solve practical problems.

PO2 : An ability to write and present a substantial technical report/document.

PO3 : Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

PROGRAM SPECIFIC OUTCOMES (PSO's):

PSO1 : Graduates able to apply the engineering management and data management concepts in industrial engineering areas.

PSO2 : Graduates able to apply industrial engineering skills and knowledge to manage the functions of production and supply chain management.

M. E. CAD/CAM

PROGRAM EDUCATIONAL OBJECTIVES (PEO's):

PEO1 : Graduates excel in Professional career and/or higher education or/ research by continuously updating the knowledge and skill in the fields of Computer Aided Design and Manufacturing.

PEO2 : Graduates can analyze the complex problems using advanced modelling and analysis tools and thereby solve problems related to product design and manufacturing area.

PEO3 : Graduates work individually and also in a team with effective communication skills and pursue lifelong learning.

PROGRAM OUTCOMES (PO's):

PO1 : An ability to independently carry out research /investigation and development work to solve practical problems.

PO2 : An ability to write and present a substantial technical report/document.

PO3 : Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

PROGRAM SPECIFIC OUTCOMES (PSO's):

PSO1 : Graduates will be able to apply the knowledge and skill in solving the real-time problems in the Computer Aided Design and Manufacturing field.

PSO2 : Graduates will be able to analyse complex problems and provide solutions using advanced tools in product design and manufacturing area.