K.L.N. College of Engineering

Pottapalayam – 630612.(11 km From Madurai City)
Tamil Nadu, India.

MECASO/MECH/VOLUME 2/ISSUE 2

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2015

DEPARTMENT OF MECHANICAL ENGINEERING

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VISION

To become a Centre of excellence for Education and Research in Mechanical Engineering.

MISSION

- Attaining academic excellence through effective teaching learning process and state of the art infrastructure.
- Providing research culture through academic and applied research.
- Inculcating social consciousness and ethical values through co-curricular and extra-curricular activities.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO I	Graduates will have successful career in Mechanical Engineering and service industries.
PEO II	Graduates will contribute towards technological development through academic research and industrial practices.
PEO III	Graduates will practice their profession with good communication, leadership, ethics and social responsibility.
PEO IV	Graduates will adapt to evolving technologies through lifelong learning.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Mechanical Engineering Graduates will be able to:

PSO 1	Derive technical knowledge and skills in the design, develop, analyze and manufacture of mechanical systems with sustainable energy, by the use of modern tools and techniques and applying research based knowledge.
PSO 2	Acquire technical competency to face continuous technological changes in the field of mechanical engineering and provide creative, innovative and sustainable solutions to complex engineering problems.
PSO 3	Attain academic and professional skills for successful career and to serve the society needs in local and global environment.

MECASO

MECHANICAL ENGINEERING NEWSLETTER

Principal Message

Presently, knowledge explosion is being ushered in our midst especially in Engineering and technology. We are working with a vision of India 2020, to bring progressive changes in Science, Engineering and Technology which will bring progress in mechanical engineering and prosperity to our country. It is my pleasure to note the glorious stride of our budding institution. The joy and experience shared in our campus ensure the growth and development of the overall personality of all the students alike. It is great to notice interesting events taking shape frequently at our campus. All of us are equally delighted to witness the happenings of significant events and tremendous achievements. I wish to record my heartly congratulations to those who have brought laurels to the institution and I appreciate all of you for working together as a team. I am sure, it is just a beginning and there are more to be happened. Go ahead and continue the good work. I wish you all the best for achieving greater success and scaling newer heights in your education and career ahead.

Principal

Dr.A.V. RAMPRASAD

Message from the Head of the Department

It is my pleasure to present the newsletter of Mechanical Engineering Department for year 2015-16. The ways we teach and the ways our students learn are unique and creative. Consistently, we took into our deficiencies and transform us to an efficient builder of social change. Many critics would confirm that the College has substantially contributed to the process of National Development by providing quality education and thereby enabling the students to become globally competent engineers. Education is not an act of process of growth. We have excelled in every initiative that we undertook and we have stood together in facing the challenges in realizing quality education.

HOD / Mech

Dr.P.Udayakumar

Air Bags

By Rajendra SinghSolanki L (121325) IV year B Section

Airbag is a type of automobile safety restraint like seatbelts. They are gas-inflated cushions set either into the steering wheel, dashboard, door, roof, or seat of a car that has a crash sensor to trigger a rapid expansion to protect people from the impact of accidents.

History

Allen Breed is holding the patent to the only crash sensing technology available at the birth of the airbag industry. Breed invented a "sensor and safety system" in 1968, the world's first electromechanical automotive airbag system.

However, rudemental patents for airbags go back to the 1950s. Patent applications were submitted by German Walter Linderer and American John W. Hedrik as early as 1953

In 1971, the Ford car company built an experimental airbag fleet. General Motors tested airbags on the 1973 model Chevrolet automobile that were only sold for government use. The 1973, Oldsmobile Toronado was the first car with a passenger air bag intended for sale to the public. General Motors later offered an option to the general public of driver side airbags in full-sized Oldsmobile's and Buick's in 1975 and 1976 respectively. Cadillacs were available with driver and passenger airbags options during those same years.

Early airbags system had design issues resulting in fatalities caused solely by the airbags.

Airbags were offered once again as an option on the 1984 Ford Tempo automobile. By 1988, Chrysler became the first company to offer air bag restraint systems as standard equipment. In 1994, TRW began production of the first gas-inflated airbag. They are now mandatory in all cars since 1998.

Types of Airbags

There are two types of airbags; frontal and the various types of side-impact airbags. Advanced frontal air bag systems automatically determine if and with what level of power the driver frontal air bag and the passenger frontal air bag will inflate. The appropriate level of power is based upon sensor inputs that can typically detect: 1) occupant size, 2) seat position, 3) seat belt use of the occupant, and 4) crash severity.

Side-impact air bags (SABs) are inflatable devices that are designed to help protect your head and chest in the event of a serious crash involving the side of your vehicle. There are three main types of SABs: chest (or torso) SABs, head SABs and head and chest combination (or "combo") SABs.

Running Robots: Systematic control strategies for four-legged machines

By V. DwaragaKannan(131057) III year A Section

A cheetah running in its natural environment is an elegant, fluid display of biomechanics. What if robots could run the same way, and be deployed for search and rescue operations in areas where conventional vehicles cannot go? According to Professor Ioannis Poulakakis, a large fraction of the earth's surface remains inaccessible to conventional wheeled ortracked vehicles, while animals and humans traverse such terrain with ease and elegance. He believes that legs have the potential to extend the mobility of robots, enabling them to become useful in real-world situations, such as search and rescue. Poulakakis is developing a family of systematic control strategies that work together with the robot's natural dynamics to generate fast, reliable and efficient running motions. His work proposes to shift the focus from ad hoc heuristic control procedures to systematic controller design algorithms that combine physical intuition with analytical tractability to stabilize running gaits on robotic quadrupeds keeping unnecessary trial-and-error experimentation ata minimum.

Funded through a grant from the National Science Foundation's Division of Civil, Mechanical and Manufacturing Innovation (CMMI),the project focuses on the running motion of quadrupeds (four legged robots) with elastic energy storage elements such as springs."Biomechanics research demonstrates that springs and running are intimately related. When you run," he explained, "the knee of the leg that is on the ground initially bends and then extends to prepare the body for take-off. During knee bending, energy is stored inelastic elements such as tendons or muscle fibers. Then, this energy is released during knee extension, pushing the body upward and forward."

In other words, when animals run, they "tune" their musculoskeletal system so that their center of mass appears to be moving as if following the motion of a pogo-stick. The complexity of the mechanisms underlying the capacity of biological legged systems to generate and support their movement can be daunting. Nonetheless, on a macroscopic level, legged locomotion can be understood through the introduction of archetypical reductive models, whose purpose is to capture the salient features of the desired gait behavior without delving into the fine details of the animal's (or robot's) structure and morphology. Such reduced-order dynamical systems can serve as literal behavioral target models to inform the design of control laws capable of stabilizing highly agile running gaits in legged robots. Poulakakis' objective is to propose models of this kind for quadrupedal locomotion, and to offer a theoretical framework that will enable analytically tractable characterizations of their dynamic properties by dealing directly with their nonlinear and hybrid nature.

“At the core of our proposed control approach is the idea of encoding the desired locomotion behaviors via suitable reduced-order, hybrid, dynamical systems. These models formalize the underlying common biomechanical principles governing agile quadrupedal locomotion,without explicitly relying on the morphological details of the robot platform,” Poulakakis said. Thus, they provide unified, platform-independent descriptions ofthe desired task and they can serve as behavioral control targets. If this becomes successful, the work would enable quadrupeds to move reliably at high speeds, self-correct to prevent falls and mimic their animalcounterpart’s running motion.

Robotic quadrupeds offer unique advantages due to their enhancedstability, high-load carrying capacity and low mechanical complexity.Their ability to travel to areas deemed unsafe for humans, Poulakakisnoted, may also enable legged robots to provide critical assistance insearch and rescue operations, and may have potential applications in industrial, agricultural and military industries. Significantly, the fundamental results of this work are expected toapply to dynamically-stable legged robots with different leg number sand postures. The control algorithms will be derived from based on the first principles that do not depend on the structural specifics of the system at hand. As a result, the proposed control design methods will be versatile and easily adaptable to accommodate diverse running tasks on robot platforms that may differ in morphological details.

In a complementary project, funded by the U.S. Army Research Laboratory, Poulakakis is investigating the contribution of torsoflexibility to performance in quadrupeds. “If this becomes successful, these research efforts will impact the study of many other engineered and biological systems which, like legged robots, accomplish their purpose through forceful, cyclic interactions with
the environment,”

Friction Stir Welding—It's Not Just For Aluminum

By Dhivakar K (121320) IV year A Section

Friction stir welding is now a proven process for joining high-carbon steels. This process does not involve temperatures high enough to melt these materials and cause unwanted metallurgical changes. Introduced in the early 1990s, friction stir welding found acceptance as a fast, high-quality method to join aluminum and other non-ferrous metals that are difficult to weld with traditional arc welding. A new generation of friction stir welding equipment brings the advantages of this process to a much broader base of applications. Unlike previous systems that required a substantial investment in a custom-engineered machine, the new system from ESAB Welding & Cutting Products (Florence, South Carolina) is based on a modular design. Given the name Legio by its developers, the new series of friction stir welding machines is built from standard modules designed to accommodate most applications. In fact, friction stir welding of high-nickel or other high-strength alloys solves some of the most difficult problems in joining these materials. According to the company, the process does so economically, bypassing the problems usually associated with arc welding of these materials.

In friction stir welding, a cylindrical shoulder tool with a profiled pin is rotated and plunged into the joining areas between two pieces of sheet or plate material. The adjacent surfaces need not be flat, thus making fillet joints and lap joints as weldable as butt joints. Heat from friction between the wear-resistant welding tool and the workpiece causes the sheet or plate to soften without reaching the melting point. The plasticized material is transferred to the trailing edge of the tool pin as the tool moves along the weld line. The material is forged by the intimate contact of the tool shoulder and the pin profile. After cooling, a solid phase bond is created between the pieces of metal that have been "stirred together." This process joins materials without the need for a filler metal or shielding gas.

Until recently, friction stir welding has been associated with "soft" or non-ferrous materials such as aluminum, magnesium, copper, zinc and lead alloys. All of these materials become plasticized enough for friction stir welding at much lower temperatures. However, the use of friction stir welding on carbon steels has been restricted because few tool materials could withstand the high temperatures and high pressures required to weld harder alloys. Recently, the use of tool bodies composed of polycrystalline cubic boron nitride (PCBN) with tips made of polycrystalline diamond (PCD) has overcome this limitation.

This technology is available in many configurations. In addition to the joining of sheet and plate, systems can be configured for welding sections of pipe. These designs involve special spindle heads and pipe clamps to hold the round workpieces in place and weld together almost any diameter of pipe. With current technology, the maximum welding depth in pipe applications is about 5/8 inch in a single pass with no joint prep.

At first glance, the typical Legio system might be mistaken for a small milling machine or a drill press.

What's "Wrong" With Welding

Arc welding thick plates requires special preparation of the weld joint. The steps involved are time-consuming and expensive. For example, the surfaces must be cleaned adequately and positioned carefully. The sides of adjacent surfaces must create an appropriate V-shape to allow the weld bead to melt into the joint in multiple passes. The V-shapes can be added by grinding, thermally cutting or nibbling with specialized tools. Between passes, any welding slag must be removed. Typically, hand tools such as wire brushes or air-powered peening tools are used to clean the joint. Friction stir welding does not need special cleaning of the surfaces because it welds completely in one pass. Thus this process is generally faster and cheaper than arc welding while maintaining good joint quality, developers say.

Experience shows that traditional arc welding of low-density materials such as castings can lead to unacceptable results. Often, cavities and voids not visible on the surface can be left in the finished welds. However, joining metals with friction stir welding can yield welds of excellent quality, even in cast materials. According to researchers at ESAB, the microstructure and homogeneity of the cast material actually improves after stir welding. Any porosity, a typical problem with castings, disappears. The microstructure of the stirred area is much finer-grained after welding, even in coarsely grained material. This effect is visible in the photo.

Arc welding high-nickel alloys such as Inconel, Monel, Waspalloy, and various stainless steels is typically performed by TIG (tungsten inert gas) welding processes, which by nature create large amounts of heat. While sufficient heat is necessary to fuse the parent and filler materials in a molten state, it can also deform and warp the components being joined. According to ESAB, correcting these conditions are the most common mode of rework following welding operations. However, friction stir welding can join plates as thick as 2.56 inches can be joined in a single pass with no deformation. In addition, joints can be welded as much as 10 times faster than conventional arc welding.

What's "Right" About The Alternative

Likewise, friction stir welding has benefits when it is used to join high-strength, low-alloy (HSLA) carbon steels. Applications for these materials have been growing in the automotive, agriculture, and heavy equipment industries. The metal inert gas (MIG) welding process is most often used to weld these materials that has been somewhat of a challenge because of the high probability that toe cracks will occur. Toe cracks are caused by poor fusion of the weld filler material into the parent workpieces. Such cracks can be remedied only by extensive off-line hand welding. This rework causes delays and adds to production costs. However, friction stir welding on these materials will not create toe cracks. According to the company, the ability to weld without using filler materials makes this joining process attractive for all series of HSLA steels, including HK65, HK80, and HK120.

Another cost advantage of friction stir welding is that a shielding gas is not needed. During arc welding, shielding gas displaces air near the molten materials so that they do not oxidize during fusion of the joint. This type of gas (argon, helium, or carbon dioxide) or gas mixture can vary by application, but typical costs can be as high as $20 per hour, per torch. Friction stir welding avoids this cost.

Moreover, friction stir welding is safe for the skin and eyes. The bright "spark" associated with arc welding is the emission of ultraviolet light produced by the electrical arc that creates the high temperature necessary for welding. The exact wavelength is not important, but the light emitted is almost 100-percent ultraviolet A rays. These rays are similar to those from the sun, but more intense. While a person might be exposed to sunlight for an extended period before damage to the skin occurs, welding light can damage unprotected skin in minutes. Exposure to unprotected eyes can cause permanent damage in seconds. Industry practice is to cover all exposed portions of the welder with PPE (personal protective equipment) including a welding helmet, thick gloves, welding smock, and fire-resistant sleeves. With friction stir welding, nothing more than typical shop apparel is required, developers point out. This helps keep supply costs low and operators comfortable. It also makes the modular approach to friction stir welding a good fit for machine shops serving automotive and other markets that can benefit from this technology.

Stirring Up New Interest

It might be said that friction stir welding is more like CNC milling than arc welding. The machines are similar in appearance and operation to other machines found in the shop.

They have no air collection systems to remove harmful fumes and no special protective barriers to safely contain welding light. Friction stir welding equipment such as the Legio machines can be installed rather easily on the typical shop floor, developers say.

This point raises another attraction to friction stir welding – it can very likely be performed by existing shop personnel. Because the conventional rules of arc welding do not apply, special skills or training are not necessary to learn how to operate these machines. According to ESAB, one of the hardest positions to fill at present is that of a skilled welder. However, friction stir welding promises to ease the demand for skilled welders in a number of applications.

High-level programming skills are not required either. Programming can be performed off-line as well as at the machine. A program must be prepared for each part, as it would for a standard VMC or other CNC machine. Programs can be uploaded and downloaded via standard DNC software and RS-232 connections. Each part program for a Legio unit controls the rotational speed of the tool, the tilting angle of the head, welding speed and down force. Standard welding speed for all models is as high as 79 ipm (2 meters/min). Once the process parameters are determined for a part, they can be stored and recalled at any time, and the results will be as predictable as rerunning a program on other CNC equipment.

Legio friction stir welding machines are available in five basic with one or two heads. They can be configured in seven size ranges to a maximum of 10 meters in length. Other applications and sizes can be accommodated with the company's customized platform of friction stir weld machines in the Super Stir series.

Friction stir welding is already an approved welding process for many aerospace, automotive and ship-building applications involving titanium, aluminum, and nickel alloys. ESAB, in a partnership with TWI, leads a significant effort to certify other materials and applications.

With the addition of friction stir welding to the list of economical and dependable welding processes, shops can provide high-value welding/joining without the experience or expense associated with traditional arc welding.

Tiny ponds play a disproportionately large role in global greenhouse gas emissions from inland waters:

By V.Muthappan, (131010) III Year C Section

Although ponds less than a quarter of an acre in size make up only 8.6% of the surface area of the world's lakes and ponds, they account for 15.1% of carbon dioxide (CO_2) emissions and 40.6% of diffusive methane (CH4) emissions. The findings appear in the Feb. 1 online edition of the journal ***Nature Geoscience***.

Our study is the first to include these small ponds in global estimates of CO_2 and CH4 emissions, largely because they are difficult to map and thought that they may play a small role in carbon cycling. The study of Yale doctoral student Meredith Holgerson is the evidence for this study.

Holgerson and co-author Peter Raymond, professor of ecosystem ecology at Yale, conducted their analysis by combining recent estimates on the global number of lakes and ponds with a compilation of direct measurements of CO_2 and CH4 concentrations from 427 lakes and ponds. They found that concentrations were greatest in smaller ponds and decreased as the ponds and lakes grew larger.

The reason that has to do with the physical makeup of very small ponds and the way they cycle carbon. Small ponds have a high perimeter-to-surface-area ratio, for example, and accumulate a higher load of terrestrial carbon -- so-called "leaf litter," sediment particles and other material. Small ponds also tend to be shallow, which means their terrestrial carbon loads are highly concentrated compared to larger lakes. Lastly, gases produced at the bottom of these ponds are able to reach the top more often than what occurs in larger lakes, due to greater water mixing and shallower waters. Because of this, CO_2 and CH4 generated in sediments affects the entire pond. That makes small ponds an important player in the carbon cycle.

The findings warrant additional research to more accurately estimate the number of tiny ponds around the world, she added. Such spots don't typically show up on satellite images, but they can be mapped using aerial images and LiDAR, a remote sensing technology that uses reflected laser light. The researchers also said their findings suggest that small ponds are likely breaking down terrestrial carbon that is not factored into assessments of the world's carbon stocks and fluxes.

The carbon cycling that happens in freshwater systems needs to be accounted for in estimates of terrestrial production. These numbers are important to quantifying the global carbon cycle and making predictions about future stocks and flows of carbon.

De-Inking Process:

By V.Muthappan, (131010) III Year C Section

Before recyling and manufacturing from paper, office waste papers and newspapers, the ink needs should be removed first, otherwise it will be dispersed into the pulp and as a result, we may dull grey papers. There are two main processes for de-inking waste paper known as washing and flotation. Before r

Washing:

The waste paper is put into a pulper with a large quantity of water and broken down into a slurry. Contaminates or 'contraries' such as staples and plastic are removed by wire mesh machines and througha mechanical action. Most of the water containing dispersed ink is drained off from the pulp through slots or screens that allow small particles through, but not the pulp. Water can be added to rinse the fibres and drained to remove more of the ink. Adhesive particles known as 'stickies' are removed by fine screening. About 80% of the original fibre is recovered by this process (though it depends on the type of washing equipment that is being used) with the remaining 20% of ink, clay, filler, plastics etc are left behind. De-inking by washing has been used with great success on old newspapers to produce stock for newsprint manufacture. It is more effective than the flotation process at removing smaller ink particles.

Flotation:

Again, the waste paper is made into a slurry and the contaminates are removed. Then special surfactant chemicals are added which makes a sticky froth on the top of the pulp. Air bubbles are blown through the pulp and they carry the ink to the surface. As the bubbles reach the top a foam layer is formed that traps the ink. The foam must be removed before the bubbles break or the ink will go back into the pulp. Because the ink is removed from the flotation machine in a concentrated form, so the flotation system does not require a larger water treatment plant. When the flotation method is used to de-ink old newspapers, around 30% used magazines are usually added for strength. The clay present in coated papers can improve de-inking efficiency as the ink attaches itself to the clay particles before floating to the surface. The flotation method is more able, than the washing method, to remove large ink particles. Yields from flotation de-inking are quoted as 90-95% but filler is not removed to the same extent as in the washing process.

The Implementation of Sixth "s" in 5s System Concerned with Safety:

By N.Pranav (131318) III Year A Section

An organization can comply with safety regulations and yet not perform as well as another organization that also complies with regulations. The difference lies in management support and a culture that integrates safety into all aspects of its continuous improvement programs such as Lean. In high-performing organizations, safety becomes a part of the same continuous improvement programs that drive productivity, efficiency, and business results.

An Aberdeen Study is identified from four key performance indicators (KPIs) to distinguish Best-in-Class from Industry Average and Laggard organizations relative to plant safety. The KPIs included overall equipment efficiency (defined as Availability X Performance X Quality), repeat accident rate, injury frequency rate, and unscheduled asset downtime.

Manufacturers in the Best-in-Class category, or top 20%, had the highest OEE (90%) and the lowest accident and injury rates (0.2% and 0.05%, respectively). In contrast, the Laggard category, or those in the bottom 30%, had the lowest OEE (76%) and the highest accident and injury rates (10% and 3.0%, respectively).

Safety is inherent to Lean principles:

Two key pillars of Lean are standardization and employee empowerment. Though they are often considered paradoxical, the pillars represent basic tenets of a safety culture. Plant safety is ensured, in part, by establishing standard operating procedures (SOPs) and work instructions (WIs). However, as operations change, employees at the source are often more aware of potentially unsafe conditions. Empowerment gives these employees an opportunity to challenge a standard and provide a corrective action before an incident occurs.

Applying 5S methodology

The following example illustrates how fall protection, the leading cause of workplace injuries, can leverage 5S methodology to reduce incidents while improving efficiency and effectiveness.

Workers require access to an elevated work area to conduct routine maintenance. The first response is a ladder. While a ladder may make sense for its practicality, it comes with its own set of safety issues and may not be efficient if workers must first locate a ladder and bring it to the work area. Keeping a ladder in the area may seem like a good solution to the efficiency issue. However, considering the "Straighten" tenet, efficiency gains may be offset by the safety risk of added workspace clutter.

Biggs conducts ABC analysis to sift items. For example, "A" items are those used every day. They should be readily accessible. "B" items, used weekly, for example, should be somewhat accessible, but out of the way. "C" items that are used infrequently can be tucked away. Taking a holistic look at the previous example from a 5S perspective, what's needed is safety access that's efficient, compliant, and unobtrusive—a solution that keeps the work area uncluttered (Straighten / Sift), meets safety regulations (Standardize) and does so consistently over time (Sustain). Can a plant meet these criteria and maintain efficiency? Modular workspaces may be the answer.

One safety module at a time

For many plants modularity strongly influences the choice in systems implemented throughout the plant. Modular systems offer a lower total cost of ownership and greater flexibility to accommodate the accelerated pace of change in business that ultimately impacts the manufacturing footprint. Changes in automation systems, packaging systems, or relocation of production from one plant to another require footprint changes that often result in less-than-efficient access.

More plants are considering modular access solutions that not only emphasize safety, but also provide flexibility to reconfigure pre-engineered and compliant modules in other difficult-to-reach areas of the plant. Modularity supports 5S tenets of Sort, Standardize, and Sustain. In our previous example of access to an elevated work area, modular stairs, rails, and a work platform are erected to enable safe efficient access. It's safer than a ladder, particularly when workers bring tools to conduct maintenance activities. And the secure platform provides needed space for tools, preventing workspace clutter.

Students Achievements / Awards won

II Year Mechanical Engg. Students won 2nd & 3rd Prize in Self Propelling Vehicle Event at National Institute of Technology, Trichy during 13-15 Mar 2015

II Year Mechanical Engg. Students won 4th Place in Robotics Championship held at IIT, Roorkee during 27-29 Mar 2015

Organization of Paper Contests – Symposium / Conference and Design Contests and achievements

S. No.	Date	Title	No. of Participants	Keynote Speakers
1.	27.03.2015 28.03.2015	3D Printing and 3D Scanning	68	Dr.AP.Natarajan, Director, Victoria Training Foundation, Hyderabad, (ESCI) Mr. P. Saikishore, Programme Coordinator, ESCI, Hyderabad Mr. Pratik Yagnik, Global3Dlabs, Bangalore
2.	12.03.2015 13.03.2015	Basics of LabVIEW and Applications	38	Mr. Geo Mathew, Trident Tech. Lab, ASG – Kerala and Karnataka. Mr.K.D. Dinesh, Application Engineer, Trident Tech Lab., Mr.R.Pradeepkannan, ASP/EIE, KLNCE

Publications and awards in inter-institute events by students of the programme of study – details of students awarded

S. No.	Date	Name of the Participant	Name of the Event, College	Event	Award / Place
1.	28.03.15	N.B.Prabhu V. Palaniappan T.Parthasarathi A.S.Nithinchand	TECKSTACY 15, Dept. of Automobile Engg. KLNCE	Aero Modeling	1st Prize
2.	13.03.15 to 15.03.15	K.Kasipandi	Prodigy 2015 NIT Tiruchirappalli	CAD Modelling	1st Place
3.	13.03.15 to 15.03.15	C.N. Jaganathan	Prodigy 2015 NIT Tiruchirappalli	CAD Modelling	1st Place
4.	13.03.15 to 15.03.15	T.Parthasarathi	Synergy 15 NIT Tiruchirappalli	Techy Hunt	2nd Place
5.	13.03.15 to 15.03.15	T.Parthasarathi	Synergy 15 NIT Tiruchirappalli	Self Propelling Vehicle	2nd Place
6.	13.03.15 to 15.03.15	A.S. Nithinchand	Synergy 15 NIT Tiruchirappalli	Techy Hunt	2nd Place
7.	13.03.15 to 15.03.15	A.S. Nithinchand	Synergy 15 NIT Tiruchirappalli	Self Propelling Vehicle	2nd Place
8.	13.03.15 to 15.03.15	K.M. Vignesh	Synergy 15 NIT Tiruchirappalli	Self Propelling Vehicle	3rd Place
9.	13.03.15 to 15.03.15	V.Palaniappan	Synergy 15 NIT Tiruchirappalli	Self Propelling Vehicle	3rd Place
10.	13.03.15 to 15.03.15	M.T. Prabhu	Synergy 15 NIT Tiruchirappalli	Self Propelling Vehicle	3rd Place
11.	13.03.15 to 15.03.15	C.R.J. Yoganath	Synergy 15 NIT Tiruchirappalli	Techy Hunt	2nd Place
12.	13.03.15 to 15.03.15	C.R.J. Yoganath	Synergy 15 NIT Tiruchirappalli	Self Propelling Vehicle	2nd Place

S. No.	Date	Name of the Participant	Name of the Event, College	Event	Award / Place
13	04.03.15	K.R.Vignesh V.M.Kesavan K.A.D.Saiprasanna K.S.Muraliprasad K.G.Vigneshbabu K.Saravanan M.Arunkumar R.Thiruvenkadamy N.G. Aravind N.B.Prabhu	ROBOZEST 15, International Level Robotics Championship held at IIT Delhi	Robotics Championship	3rd Level
14	04.03.15	Mohammad Ashraq Hassan L.M. Harishbabu K.K.Gowtham B.JeyendraSenthil M.Mithun Balachandar AshwinEmbesirS Tendulkumar.M. Kumaresan.M.S. Manoj.P. Sudharson.A. NishithRoshan.S. Aswinkumar.S.J. Arunkumar.R. FranklinRamvel M.Periyaboopathy S.M.DhanamBalaji	ROBOZEST 15, International Level Robotics Championship held at IIT Delhi	Robotics Championship	3rd Level

Symposium / Conference – Participants List

S. No.	Date	Name of the Participant	Programme and Venue	Event
1	28.3.15	M.T.Prabhu V.Palaniappan C.R.J.Yoganath T.Parthasarathi A.S.Nithinchand N.B.Prabhu	TECSTACY 15, Dept. of Automobile Engg. KLNCE	Auto Quiz
2	28.3.15	I.Sonaimuthu K.M.Vignesh	TECSTACY 15, Dept. of Automobile Engg. KLNCE	CAD Modeling

Faculty Workshop / FDP Attended / Resource Person / Publication

Sl. No	Date	Staff Name	Title	Program	Location
1	24.03.2015	Mr. G. R. Kathiresan	Supply chain & Inventory Management	Presented Guest Lecture to the participants	Madittsia Madurai

Seminar / Workshop / FDP / Conference attended

Sl. No	Date	Staff Name	Title	Program	Location
1.	06.04.2015 to 18.04.2015	Mr. M. A. Saravanan	Recent Advances In Supply Chain Network Management	Aicte Sponsored Two Week Faculty Programme	Rajalakshmi Engineering College, Thandalam, Chennai.
2.	06.04.2015 to 18.04.2015	Mr. M. Satheesh Kumar	Recent Advances In Supply Chain Network Managemen	Aicte Sponsored Two Week Faculty Programme	Rajalakshmi Engineering College, Thandalam, Chennai.

Paper Publication

S. No	Date	Name	Title	Journal
1	24.03.2015	Mr. P. Sabarinath	Energy conservation by design optimization of flywheel using Flower pollination Algorithm	Journal of Chemical and Pharmaceutical Sciences ISSN: 0974-2115 Special Issue 7: 2015 pp.166 – 171

Paper Presentation

S. No	Date	Staff Name	Title	Location
1	02-04-2015 to 03-04-2015	Mr. P. Sabarinath	Multi objective Design Optimization of Helical gear pair using Adaptive parameter Harmony search Algorithm	International Conference on Mechanical and Manufacturing Engineering (ICMME 2015) April 2-3, 2015 Sri Chandra Sekharendra Saraswathi ViswaMahavidyalaya, Enathur, kanchipuram–631561
2.	02.04.15 to 03.04.15	Mrs. C. Anbumeenakshi	Effect Of Geometrical Parameters On Flow Mal-Distribution In A Wavy Microchannel	Sri ChandrasekharendraSaraswathiViswaMahavidyalaya University, Kanchipuram
3.	02.04.15 to 03.04.15	Mrs. C. Anbumeenakshi	Experimental Investigation of Heat Transfer in coated Microchannels for MEMS Applications	Sri ChandrasekharendraSaraswathiViswaMahavidyalaya University, Kanchipuram
4.	02.04.2015 to 03.04.2015	Mr.Nagasubramanian	Numerical Study of Free Convection in a Square Enclosure with a Baffle on Vertical Wall	International Conference on Mechanical and Manufacturing Engineering, (ICMME 2015) held at SCSVMV University, Kanchipuram.
5.	02.04.2015 to 03.04.2015	Mr. M. Satheesh Kumar	Experimental Investigation of Heat Transfer on Coated Microchannel	International Conference on Mechanical and Manufacturing Engineering, (ICMME 2015) held at SCSVMV University, Kanchipuram.
6.	02.04.2015 to 03.04.2015	Mr. M. Satheesh Kumar	Effect of geometrical parameters on flow mal-distribution in a wavy microchannel	International Conference on Mechanical and Manufacturing Engineering, (ICMME 2015) held at SCSVMV University, Kanchipuram.

PROGRAM OUTCOMES (POs)

Mechanical Engineering Graduates will be able to

1.	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to 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.	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 limitations.
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.
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.
8.	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9.	Individual and team work: 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 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.

K.L.N. COLLEGE OF ENGINEERING

VISION

To become a Premier Institute of National Repute by Providing Quality Education, Successful Graduation, Potential Employability and Advanced Research & Development through Academic Excellence.

MISSION

To Develop and Make Students Competent Professional in the Dynamic Environment in the field of Engineering, Technology and Management by emphasizing Research, Social Concern and Ethical Values through Quality Education System.

Principal President Secretary & Correspondent