K.L.N. College of Engineering

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

MECASO/MECH/VOLUME 2/ISSUE 3

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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

KLN College of Engineering is the Madurai's first Self-financing engineering college. Since the establishment, college is well supported by industry and society. We have signed MOU with industries for enhancement of technical skills of the students. Committed faculty, quality teaching -learning methods, well equipped labs and association with the industry are the strengths of the college. Here, we strive for the overall development of the students, so that they will be confident to stand and succeed in the world outside. Friendly, positive and energetic environment of Cummins College leads to wonderful experience of learning.

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Principal

Dr. A.V. RAMPRASAD

Message from the Head of the Department

We are happy to inform that our pride rests in the monthly magazine "MECASO", which highlights the academic and non-academic activities of students of the department. During every semester, the calendar of events is prepared, which implicitly incorporates all the curricular and extra-curricular activities of the department and it is followed meticulously without any deviation. Importance is given to quality teaching and learning process through faculty development programs for teachers and soft skill programmes for students. Special care is taken for the students, whose performance is poor in the examinations through counselling and extra classes.

There is continuous internal evaluation of students through unit tests, internal assessment tests and quiz programmes. The problems of students are solved to the extent possible as and when they arise. The attendance and progress reports are sent to the parents after every internal assessment tests. The parents of weak students are informed about their status by telegram and also by telephone calls. The attendance of students are monitored on hourly basis and is updated online daily in the students' progress report.The students are encouraged to participate in seminars conducted by other Engineering Colleges. They are made to compulsorily participate in the weekly departmental activities such as debate, extempore, group discussion, Quiz and brain storming sessions. At least three expert lectures are arranged every semester by experts from industries and leading Educational Institutions on advance topic to the benefits of both staff and the students. The staff members are encouraged to attend national and state level workshop to enhance their knowledge. Every effort is made to constantly improve the results of the students. I am very happy to inform that due to the concerted efforts of both staff and students, the results are very encouraging this time in case of higher semesters. The results of the lower semesters are also constantly improving

HOD/Mech

Dr. P. Udayakumar

News Letter Editorial Board

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- V.DwaragaKannan III year A Section
- GoushikNa G IV year A Section
- Deepaklal K S IV year A Section

How to Overcome Negative Thoughts?

By **Annalakshmi K (121038) IV year C Section**

If we think we can, we can! If we believe we cannot, we cannot! Negative thoughts leads to negative results, because our thoughts are of negative atmosphere. On the contrary, thinking positively, we can create a positive atmosphere which makes positive results a certainty. How do we go about shifting our mind from negative thoughts to positive thoughts?

1. For the next 24 hours, let us deliberately speak hope fully about everything – about our job, Our health, our aim, our goal and our future. We should go on talking about everything in a positive way. It may be difficult, but we will have to come out from our old habit by our will power and determination.
2. After speaking hopefully for 24 hours, we must feed our mind with good, nourishing, wholesome thoughts of a positive nature. We can increase the period of positive thinking and in course of time, we will discover that our negative thoughts have been transformed into positive thoughts.
3. We should make a list of our friends and determine who the most positive thinkers among them are and deliberately cultivate their company and their positive thoughts.
4. Let us be careful! Never indulge in arguments of negative opinions, but we may always oppose with a positive opinion.
5. Watch our thoughts, they become our words; Watch our words, they become our actions;
6. Watch our actions, they become our habits; Watch our habits, they become our character.

In fine sense, we, by constant practice, can overcome negative thoughts of failure and cultivate positive thoughts of success.

Winning through English

By Prajeesh K (121002) IV year B Section

"I can't able to tell you." This might just be one instance of a grammatically wrong sentence that often is a part of everyday conversations but it is just the tip of the iceberg as far as communication in business rooms is concerned. According to the survey by employability measurement company Aspiring Minds, the English learning level among engineering graduates is very poor in India. The survey which analysed the English skills of over 55,000 aspiring engineers in 250 different engineering colleges, said "around 36 per cent of engineering graduates would be unable to read official reports and transcripts and derive information out of them, even when the information is explicitly stated."While Tamil Nadu has an excellent recruitment record with the State supplying the largest number of engineers, surveys on employability have cast the State in a poor light. A few months ago, Aspiring Minds also came out with a survey that said Tamil Nadu figured the lowest on the employability index. "This is mainly because they are not able to converse in English. Most of them are not confident of themselves," the study concluded.

One reason for the problem is the limited use of English in colleges though the language is the medium of instruction. "More than 70 per cent of the class is from rural areas and they understand nothing when taught in English. Colleges need to do their bit to inculcate an interest in the language among students but it must not just be for the sake of ensuring placements, says R.Prabha, who trains students on communication skills. "Every one thinks business English is sufficient to get a job and sustain it. But that way, one does not get a hang of conversational English, which is very important as you climb up the ladder. "As a result, students will be able to explain technical points but are at a loss when it comes to interacting and conversing comfortably with others," she adds. There is dire lack of awareness of the issue. For instance, most bulletin boards are insensitive to the topic and common mistakes in conversation are at best a source of humour. "Companies want the best communicators who can work in tandem with clients and there is no other way to that without knowing to speak English,"

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Mechanical Engineers

By PalaniyappanV(131051) III Year B Section

- Machine drawing is our favourite language
- Machine sound is our favourite music
- Uniform is our favourite dress
- Dirty spoils beauty, but for me beauty is always dirty
- We are different from others because
- We always like to spend our time with machines
- Our identification is uniform with grease smell
- We love machines also,
- So grease smell is always on me
- No one can imagine the world without machine
- So we have to be proud to say machinist

Final touch:

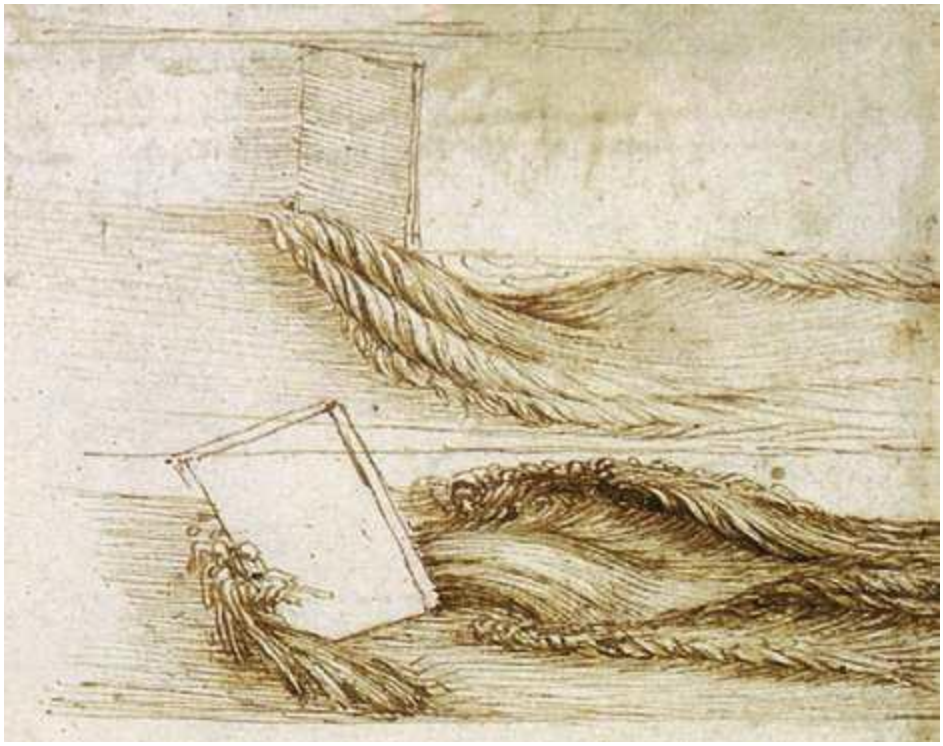
- We are innovators
- We are problem solvers
- We are solution analyser
- We are decision makers
- We are synthetic evaluators
- We are machine designers
- We are great engineers

Few Persons to Remember

By Gowthaman S D (121105) IV year C Section

Leonardo da Vinci - Italy (1452-1519)

- Leonardo set out to observe all natural phenomena in the visible world, recognizing their form and structure, and describing them pictorially exactly as they are.
- He planned and supervised canal and harbor works over a large part of middle Italy. In France he designed a canal that connected the Loire and Saone.
- His contributions to fluid mechanics are presented in a nine part treatise (*Del moto e misuradell'acqua*) that covers the water surface, movement of water, water waves, eddies, falling water, free jets, interference of waves, and many other newly observed phenomena.



Isaac Newton - England (1643-1727)

- One of the most important figures in science.
- Most well known for his three laws of motion.
- His key contributions to fluid mechanics include

- The second law: F=m.a.
- The concept of Newtonian viscosity in which stress and the rate of strain vary linearly.
- The reciprocity principle: the force applied upon a stationary object by a moving fluid is equal to the change in momentum of the fluid as it deflects around the front of the
- object.
- Relationship between the speed of wave sat a liquid surface and the wavelength.

Osborne Reynolds - England (1842-1912)

- Reynolds was a prolific writer who published almost 70 papers during his lifetime on a wide variety of science and engineering related topics.
- He is most well-known for the Reynolds number, which is the ratio between inertial and viscous forces in a fluid. This governs the transition from laminar to turbulent flow.
- Reynolds' apparatus consisted of a long glass pipe through which water could flow at different rates, controlled by a valve at the pipe exit. The state of the flow was visualized by a streak of dye injected at the entrance to the pipe. The flow rate was monitored by measuring the rate at which the free surface of the tank fell during draining. The immersion of the pipe in the tank provided temperature control due to the large thermal mass of the fluid.

Lewis Fry Richardson (1881-1953)

- In 1922, Lewis Fry Richardson developed the first numerical weather prediction system.
  - Division of space into grid cells and the finite difference approximations of Bjerknes's "primitive differential equations."
  - His own attempt to calculate weather for a single eight-hour period took six weeks and ended in failure.
- His model's enormous calculation requirements led Richardson to propose a solution he called the "forecast-factory."
  - The "factory" would have filled a vast stadium with 64,000 people.
  - Each one, armed with a mechanical calculator, would perform part of the calculation.
  - A leader in the center, using colored signal lights and telegraph communication, would coordinate the forecast

Amphibious Vehicle

By Jaswanthkumar K.D (151920) II year A Section

An Amphibious vehicle is a means of transport, viable on land as well as on water . It is simply may also called as Amphibian. Amphibious vehicle is a concept of vehicle having versatile usage. It can be put forward for the commercialization purpose with respect to various applications like in the field of military and rescue operations. Researchers are working on amphibious vehicle with capability to run in adverse conditions in efficient way.

Need of Amphibious Vehicle

About 75% of Earth‘s surface is covered by water. A vehicle that could travel on land and water could potentially change current transportation model. Transportation on land is very common but on the other hand water ways are naturally available but are not considerably used relatively and here the Amphibian vehicles are proved to be beneficial.

Amphibious buses

Amphibious buses are employed in some locations as a tourist attraction. A recent design is the Amphi Coach.

Amphibious Cars

Amphibious automobiles have been conceived from ca. 1900, however the Second World War significantly stimulated their development. Two of the most significant amphibious cars to date were developed during World War II. The most proliferous was the German Schwimm wagen, a small jeep-like 4x4 vehicle designed by the Porsche engineering firm in 1942 and widely used in World War II. The amphibious bodywork was designed by Erwin Komenda, the firm's body construction designer, using the engine and drive train of the Kübelwagen. An amphibious version of the Willys MB jeep, the Ford GPA or 'Seep' (short for Sea jeep) was developed during World War II as well.



A specially modified GPA, called Half-Safe, was driven and sailed around the world by Australian Ben Carlin in the 1950s. One of the most capable post-war amphibious off-roaders was the German

Amphi-Ranger, that featured a hull made of seawater-resistant AlMg2 aluminium alloy. Extensively engineered, the Amphicar is still the most successfully produced civilian amphibious car to date. The Gibbs Aquada stands out due to its capability of high speed planning on water. Other amphibious cars currently in production include the Dutton Commander 'AmphiJeep' (GB), the US Hydra Spyder and WaterCar, as well as several Chinese designs like the JMC BY5020TSL and BJ5032(XZHE), and the even longer JMC JX5021TLYDS. American distributor Rodedawg is now seeking to bring an adapted version of the Chinese amphibs to America.

Amphibious Trucks and Barges

With more than 20.000 units produced, the DUKW was the most successful amphibious truck of World War II. During the Vietnam War, the US Army used the amphibious articulated Gama Goat and the larger Caterpillar_Goer‘ truck-series to move supplies through the canals and rice paddies of Southeast Asia. Although the vehicles‘ wheels were mounted without suspension or steering action.



Introduction to CFD

BY Siva Kumar M R (121104) IV Year B Section

What is computational fluid dynamics?

- Computational fluid dynamics (CFD) is the science of predicting fluid flow, heat transfer, mass transfer, chemical reactions, and related phenomena by solving the mathematical equations which govern these processes using a numerical process.
- The result of CFD analyses is relevant engineering data used in:
  - Conceptual studies of new designs.
  - Detailed product development.
  - Troubleshooting.
  - Redesign.
- CFD analysis complements testing and experimentation.
  - Reduces the total effort required in the laboratory.

CFD - how it works

- Analysis begins with a mathematical model of a physical problem.
- Conservation of matter, momentum, and energy must be satisfied throughout the region of interest.
- Fluid properties are modeled empirically.
- Simplifying assumptions are made in order to make the problem tractable(e.g., steady-state, incompressible ,inviscid, two-dimensional).
- Provide appropriate initial and boundary conditions for the problem.

CFD applies numerical methods (called discretization) to develop approximations of the governing equations of fluid mechanics in the fluid region of interest.

- Governing differential equations: algebraic.
- The collection of cells is called the grid.
- The set of algebraic equations are solved numerically (on a computer) for the flow field variables at each node or cell.

System of equations are solved simultaneously to provide solution.

- The solution is post-processed to extract quantities of interest (e.g. lift, drag, torque, heat transfer, separation, pressure loss, etc.).

Applications of CFD

- Applications of CFD are numerous!
  - Flow and heat transfer in industrial processes (boilers, heat exchangers, combustion equipment, pumps, blowers, piping, etc.).
  - Aerodynamics of ground vehicles, aircraft, missiles.
  - Film coating, thermoforming in material processing applications.
  - Flow and heat transfer in propulsion and power generation systems.
  - Ventilation, heating, and cooling flows in buildings.
  - Chemical vapor deposition (CVD) for integrated circuit manufacturing.
  - Heat transfer for electronics packaging applications.
  - And many, many more!

Advantages of CFD

- Relatively low cost.
  - Using physical experiments and tests to get essential engineering data for design can be expensive.
  - CFD simulations are relatively inexpensive, and costs are likely to decrease as computers become more powerful.
- Speed.
  - CFD simulations can be executed in a short period of time.
  - Quick turnaround means engineering data can be introduced early in the design process.
- Ability to simulate real conditions.
  - Many flow and heat transfer processes can not be (easily) tested ,e.g. hypersonic flow.
  - CFD provides the ability to theoretically simulate any physical condition. Ability to simulate ideal conditions.
  - CFD allows great control over the physical process, and provides the ability to isolate specific phenomena for study.
  - Example: a heat transfer process can be idealized with adiabatic, constant heat flux, or constant temperature boundaries.
- Comprehensive information.
  - Experiments only permit data to be extracted at a limited number of locations in the system (e.g. pressure and temperature probes, heat flux gauges, LDV, etc.).

– CFD allows the analyst to examine a large number of locations in the region of interest, and yields a comprehensive set of flow parameters for examination

Limitations of CFD

- Physical models.

– CFD solutions rely upon physical models of real world processes(e.g. turbulence, compressibility, chemistry, multiphase flow, etc.).

– The CFD solutions can only be as accurate as the physical models on which they are based.

- Numerical errors.

– Solving equations on a computer invariably introduces numerical errors.

– Round-off error: due to finite word size available on the computer. Round-off errors will always exist (though they can be small in most cases).

– Truncation error: due to approximations in the numerical models. Truncation errors will go to zero as the grid is refined. Mesh refinement is one way to deal with truncation error.

Boundary conditions.

– As with physical models, the accuracy of the CFD solution is only as good as the initial/boundary conditions provided to the numerical model.

– Example: flow in a duct with sudden expansion. If flow is supplied to domain by a pipe, you should use a fully-developed profile for velocity rather than assume uniform conditions.

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**