Technical talks organized by the Department of Mechanical Engg. in the even semester – 2014

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A technical talk on the topic “Introduction to multi-agent multi-robotic systems” was delivered by Dr. K.R. Guruprasad, Assistant Professor, Dept of Mechanical Engg, NITK Surathkal on 11th February 2014. The talk “Introduction to multi-agent multi-robotic systems” specifically focused on the advanced robotics in engineering field. He spoke about evolution of robots and their applications in engineering field. Most famous emerging technology of Robotics and their applications-Micro fly in military intelligence, Humanoid robot as human duplicate, Pollen-Robo in weather forecasting, Robert
Spencer for underwater use, Medical robotics, robotic suit, robots in planetary explore missions were discussed.

Figure: Robots in engineering applications
Mechanical systems - an experiential learning

Dr. K V Gangadharan
Professor, Dept of Mech Engg, NITK Surathkal

A technical talk on the topic “Mechanical systems - an experiential learning” was delivered by Dr. K V Gangadharan, Professor, Dept of Mechanical Engg, NITK Surathkal on 18th February 2014. The talk “Mechanical systems - an experiential learning” specifically focused on enriching the learning experience through experimental learning of science and technology in a virtual learning environment on preferred location at any time. He spoke about the remote laboratory (also called virtual lab) which was designed and published in internet by NITK students. In which the authorized students can log into the laboratory using the internet connection and use the experimental setup in the allotted time slot. Professor also talked about how remote laboratory is realized using LabVIEW (Virtual Instrumentation Engineering Workbench) and NI hardware for data acquisition. NI’s LabVIEW is one of the most widely used integrated development environments for instrumentation, control and digital signal processing development.
The main benefits of this program are: students having better problem solving skills, students build on experiences in previous courses. Students have a stronger understanding of modeling concepts. Students have the tools that enable them to solve more difficult problems and more actively engaged in the learning process both inside out outside the classroom.
A technical talk on the topic “Engine Exhaust Emission Control: Technologies and Devices”, was delivered by Dr. P Mohanan, Professor, Dept of Mech Engg, NITK Surathkal on 25th February 2014. The talk was specifically focused on motor vehicle emissions, common causes of high hydrocarbons, CO, No\textsubscript{x}, emission norms for heavy diesel vehicles, gasoline and also advanced technologies in IC engines to control emission. The topic concluded that “Homogeneous Charge Compression Ignition (or HCCI)”, is a relatively new combustion technology to control emission in IC engines. In an HCCI engine, a dilute, premixed fuel/air charge auto ignites and burns volumetrically as
a result of being compressed by the piston. In HCCI, combustion start is dependent only on the thermo-chemical conditions inside the cylinder.

Fig 1: Homogeneous Charge Compression Ignition (or HCCI) system

Fig 2: No flame, combustion due to compression heating in HCCI
Adopting HCCI technology, thermal efficiency of an engine can increase up to 20%, Average NOx reduction will be 24%, and smoke capacity can reduce up to 45%. Finally students and faculty of the department enjoyed and got best benefit the session.
A technical talk on the topic “Vegetable Oil Based Cutting Fluids And Environmental Issues In Manufacturing” was delivered by Dr. Thomas Pinto, Professor & HOD, Dept. of Mechanical Engg. Dean(Administration), S.I.T., Mangalore on 11th March 2014. The talk “Vegetable Oil Based Cutting Fluids and Environmental issues in Manufacturing” specifically focused on role of cutting fluids in machining operations by cooling the machining zone and impact shop productivity, tool life and quality of work. He said that, he growing demand for biodegradable materials has opened an avenue for using bio-resources as an alternative to petroleum based materials.
He spoke about recent advances in cutting fluids like Cryogenic cooling (liquid nitrogen at –190°C ), Solid Lubricants, mainly on vegetable oil based coolants (ex: palm oil, groundnut oil, castor oil, soybean oil and rapeseed oil based coolants. Mainly machining of steels, Cu, Al by WC(coated and uncoated), CBN and PCD tools.)

![Figure: Vegetable oil as a curring fluid](image)

He presented seminar mainly on a case study in which, Mahua oil, honge oil, gingelly oil and cottonseed oil were used as cutting fluids. Mineral oil and synthetic fluids were also used for comparison. Throwaway WC tips-CNMG 120404 FM TN 8135, P20 (ISO) grade, Widia Make and HSS Bits-Miranda S400 (10% Co) Size ½ “ square x 6” length were used as cutting tools.

He concluded that, surface finish improved by 20-50% with bio-coolants, tool life increased by 30-35% with bio-based coolants, cutting forces (Fc and Ft )are lesser by 20-50%, reduction of μ by 10-15%, chip
reduction co-efficient decreased with bio-based coolants, yool
temperatures are somewhat lesser with the proposed coolants with both
HSS and WC tools, proposed coolants are much cheaper than the
commercial coolants, physical and chemical properties of proposed
coolants are found suitable. test reports indicate the proposed coolants
are environmental friendly.
A technical talk on the topic “Occupational Safety, Health and Environment (O.S.H.E)” was delivered by Thirumaleshwara Bhat Professor and Head, Department of Mechanical Engineering St. Joseph Engineering College Vamanjoor, Mangalore. on 18th March 2014. The talk “Occupational Safety, Health and Environment” specifically focused on Human Behavior towards Safety in working environment with all fields. Occupational safety and health (OSH) is an area concerned with protecting the Safety, Health and Welfare of people engaged in Work or Employment.” The goals of occupational safety and health programs include promoting a safe and healthy work environment. OSH may involve interactions among subject areas, like  

➢ occupational medicine,  
➢ occupational hygiene,
➢ public health,
➢ safety engineering,
➢ industrial engineering,
➢ health physics,
➢ industrial and organizational psychology,
➢ ergonomics
➢ occupational health psychology.

He said that, the majority of the working population belongs to the unorganized sector, which is not in the purview of current legislation in occupational health. The working population being largely illiterate is unaware of the hazards associated with their occupation. Awareness and health education programme should be carried out for the workers, supervisors and owners/management of the factories/mines engaged in hazardous process.