AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY
OMR, PAIYANOOR, CHENNAI - 603104

VINAYAKA MISSION'S RESEARCH FOUNDATION
(Deemed to be University under section 3 of the UGC Act 1956)

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DEPARTMENT OF MECHANICAL ENGINEERING

Association with

ENERGY AND FUEL USERS'ASSOCIATION (ENFUSE) &
Institution's Innovation Council (IIC)

Organizes

Employability Enhancement Skill Development Course on "ENERGY AUDITING, BIO FUELS AND SOLAR ENERGY" (From 13.05.2021& 14.05.2021, 19.5.2021 to 21.5.2021 -30 Hours)

The Department of Mechanical Engineering in association with Energy and Fuel users' Association & Institution's Innovation Council (IIC)organised a five day's **Employability Enhancement Skill Development Course** on "**ENERGY AUDITING, BIO FUELS AND SOLAR ENERGY** " **From 13.05.2021& 14.05.2021, 19.5.2021 to 21.5.2021 -30 Hours).** The program was inaugurated by **Prof. L. Prabhu, HOD / Mech.** Totally 10 sessions were conducted for five days with various resource persons. Around 134 Mechanical and Automobile Engineering students have participated.

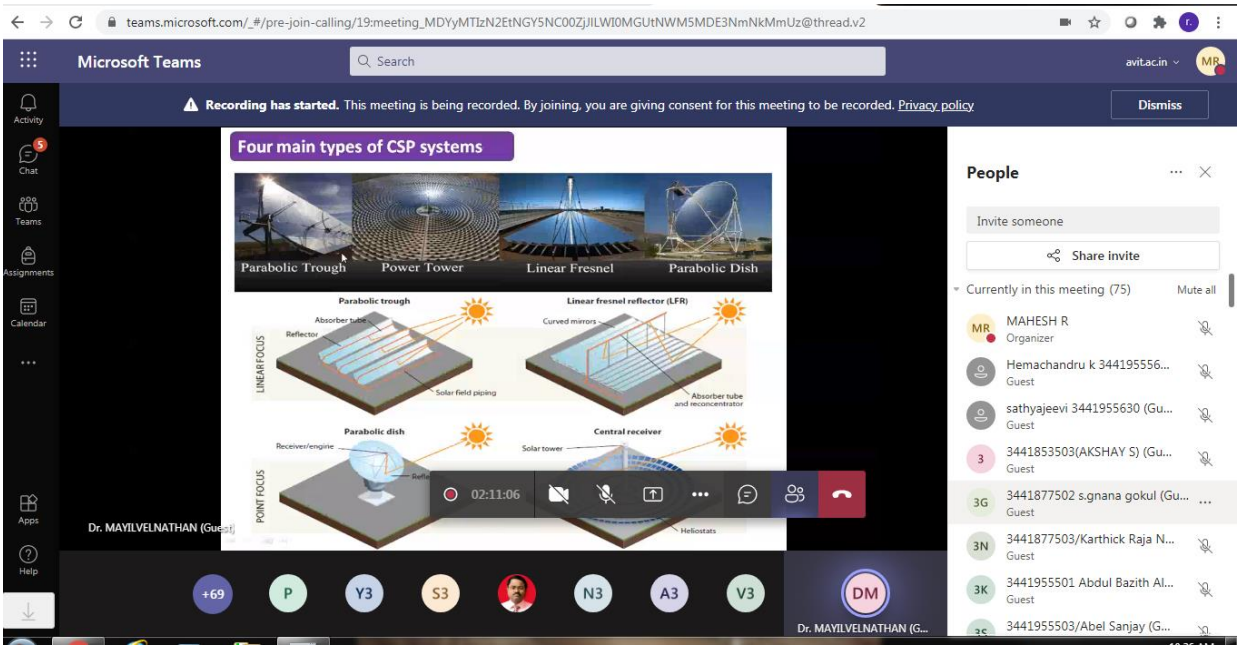
The students had an interaction with the experts and the following topics were discussed.

SESSION 1: SOLAR ENERGY (9 AM to 12PM)

The first session on Solar Energy was conducted by Dr.Mayilvelnathan, HOD/Mech.Engg, Md.Sathak college of Engineering, Kilakarai.

He has shared his magnificent proficiency on

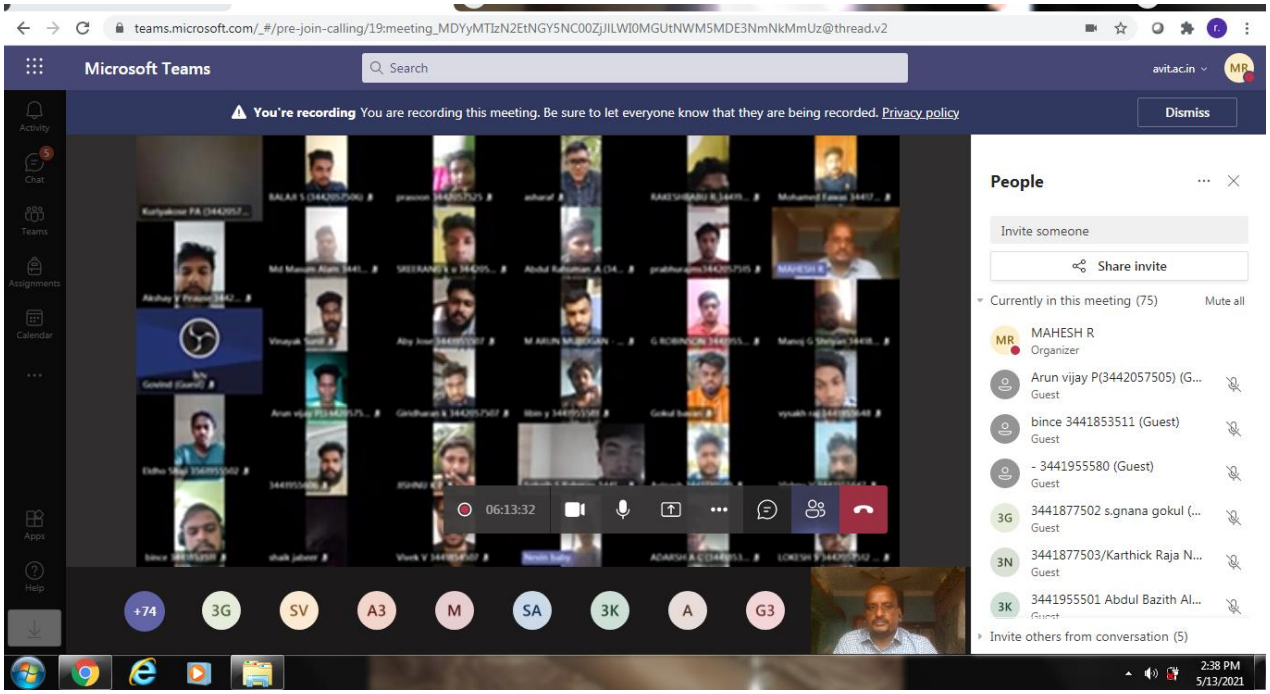
- Energy production from solar – How Solar radiation is converted directly into electricity by solar cells.
- Methods of energy production from Solar - The two main methods: photovoltaic cells and solar thermal collectors.
- CSP System - How plants use mirrors to concentrate the sun's energy to drive traditional steam turbines or engines that create electricity.
- Solar Collectors – How the Flat plate collectors and Concentrator collectors works
- Energy storage systems - The capture of energy produced at one time for use at a later time to reduce imbalances between energy demand and energy production.
- Solar power plant - The type of facility that converts sunlight either directly, like photovoltaics, or indirectly, like solar thermal plants, into electricity.



SESSION 2: ALTERNATIVE FUELS (1 PM to 4 PM)

The second session on Alternative fuels was conducted by Mr.R.Mahesh,AP/Mech, AVIT.
He has shared his splendid oration on

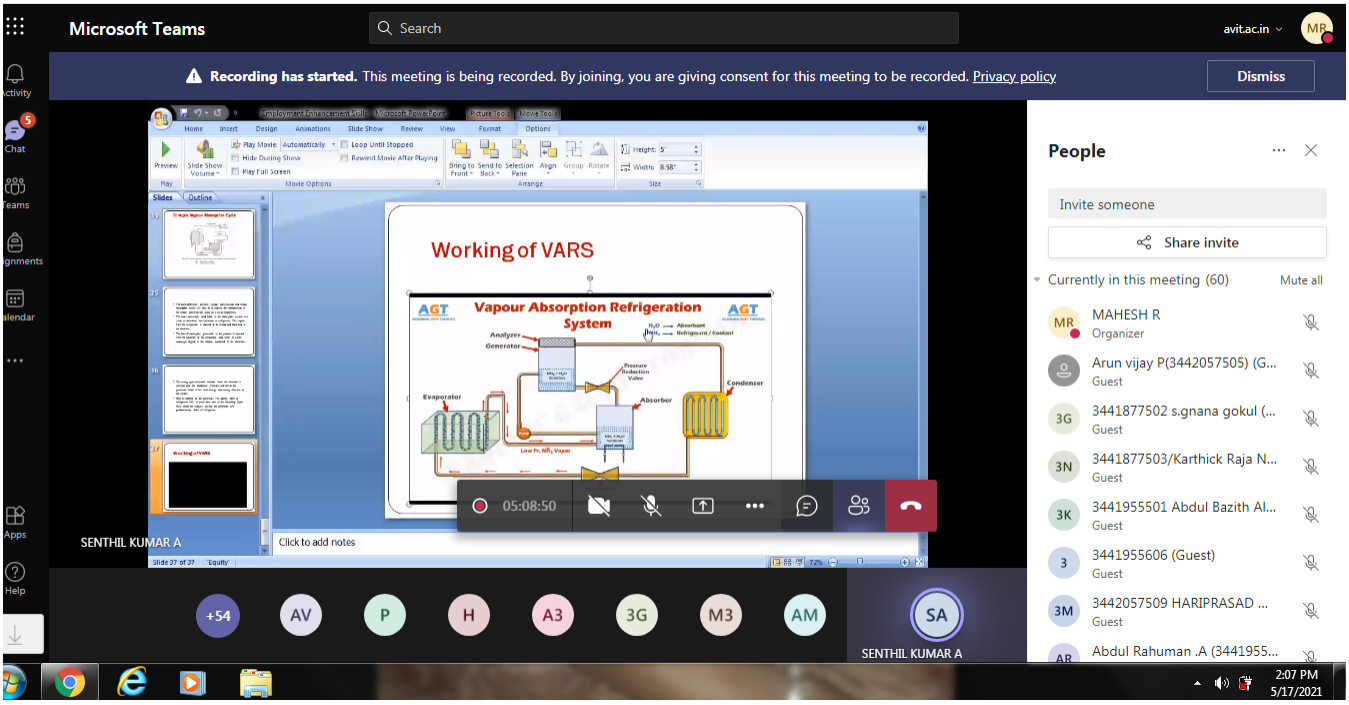
- Biodiesel production- the process of producing the biofuel, biodiesel, through the chemical reactions of transesterification and Esterification.
- Ethanol preparation- The steps in the ethanol production process include milling, Liquefaction, Saccharification , Fermentation Distillation and Dehydration
- Methodology for biodiesel - Various biodiesel production methods have been introduced, such as direct use and blending, microemulsion, transesterification, and pyrolysis.
- Energy production from Waste- Waste-to-energy plants burn municipal solid waste (MSW), often called garbage or trash, to produce steam in a boiler that is used to generate electricity.
- Usage of Ethanol in I.C.Engines- Pros and cons of ethanol usage.



SESSION 3: REFRIGERATION (9 AM to 12PM)

The third session on Refrigeration was conducted by Mr.A.Senthilkumar,AP/Mech, AVIT.
He has shared his striking lecture on

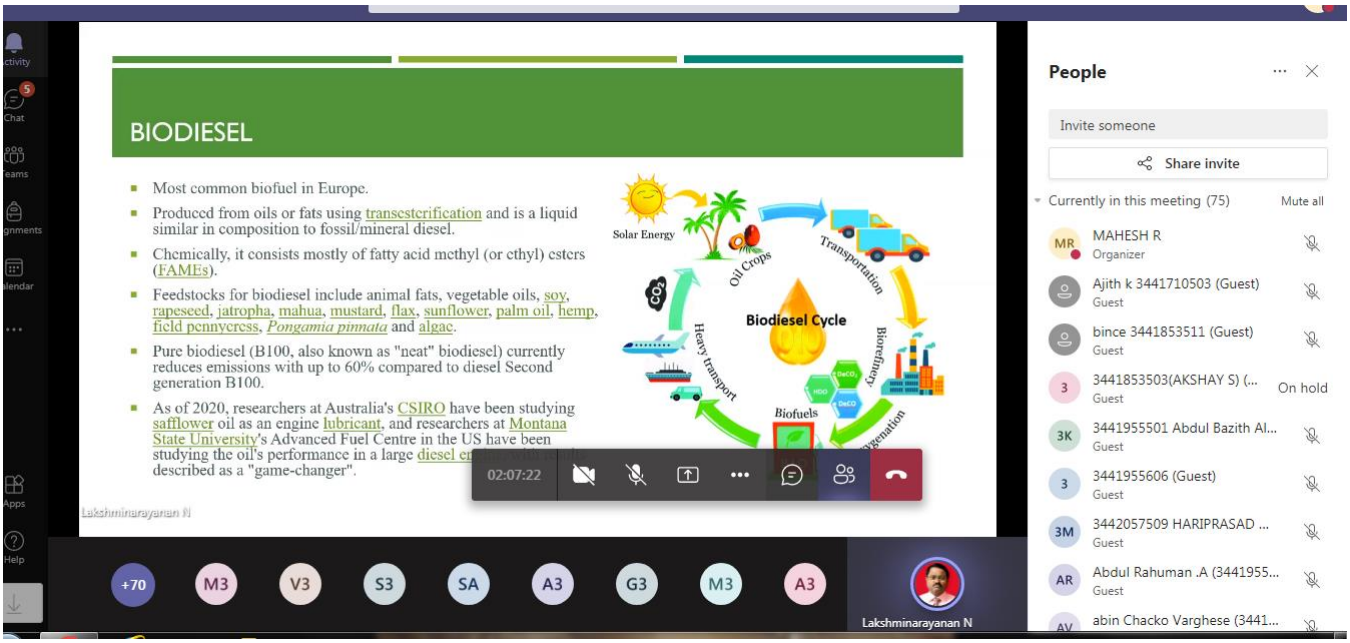
- Refrigeration- cooling a space, substance or system to lower and/or maintain its temperature below the ambient on.
- Vapour compression systems- in which the refrigerant undergoes phase changes, is one of the many refrigeration cycles and is the most widely used method for air-conditioning of buildings and automobiles.
- Vapour absorption systems- In this system an absorber, a pump, a generator and a pressure reducing valve replace the compressor
- Application of Nano particles in Vapour compression systems.- In refrigeration systems, nanolubricant improves tribological characteristics improving compressor performance; nanorefrigerant improves thermo-physical properties, improving refrigerating effect.



SESSION 4: BIO FUELS (1 PM to 4 PM)

The fourth session on Bio-fuels was conducted by Mr.N.Lakshminarayanan, Asso.Prof/Mech, AVIT.
He has shared his spectacular articulation on

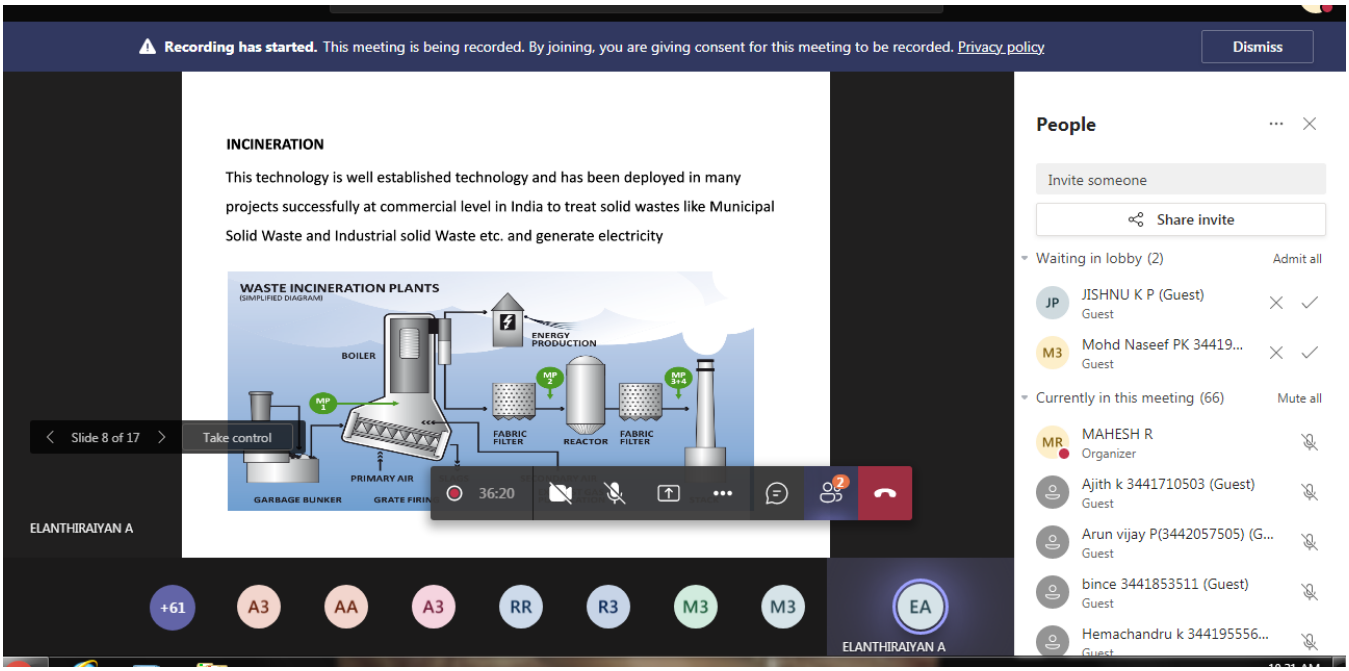
- Bio Fuel Production - the production from vegetable oils, yellow grease, used cooking oils, or animal fats.
- Various methods of production in Biodiesel- Various biodiesel production methods have been introduced, such as direct use and blending, microemulsion, transesterification, and pyrolysis
- Employment opportunities in Renewable energy sources - "Green" jobs in the renewable-energy industry are seeing a spike in popularity, with plenty of lucrative roles expected to be in demand.



SESSION 5: RENEWABLE ENERGY (9 AM to 12PM)

The fifth session on Renewable energy was conducted by Mr.Srinivas, RA Energy Systems.
He has shared his awesome speech on

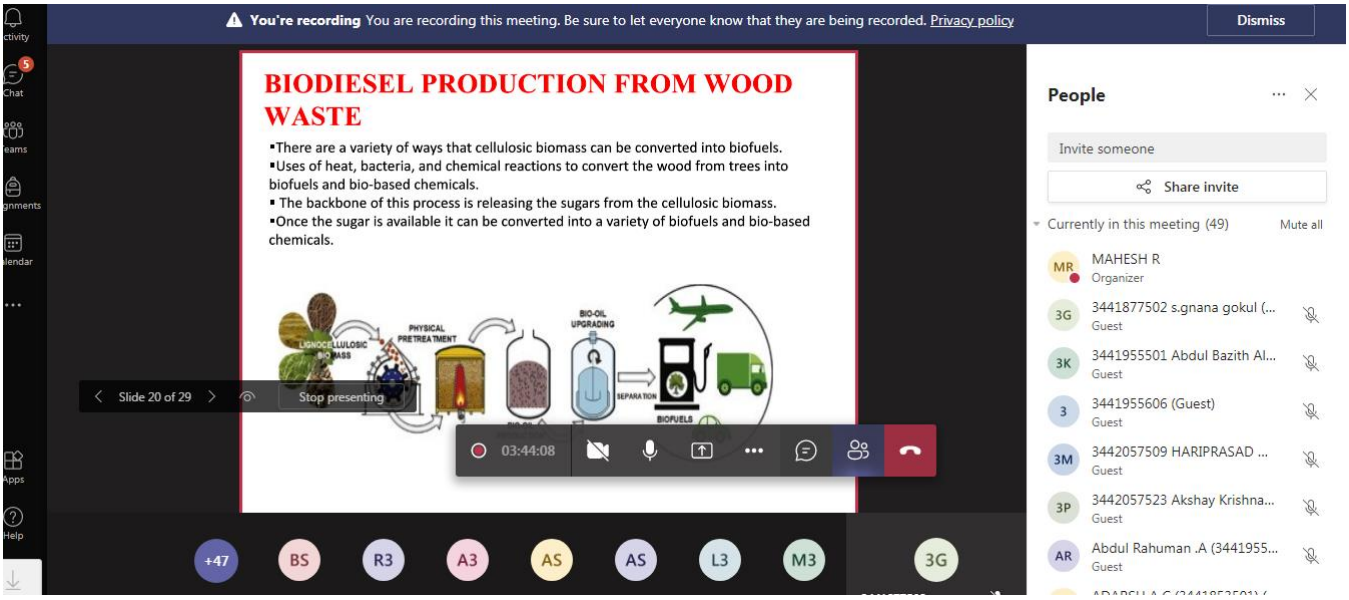
- Non-Conventional Energy sources - sources that are continuously replenished by natural processes like solar energy, wind energy, bio-energy - bio-fuels grown sustain ably), hydropower etc.,
- Tidal Energy - Power produced by the surge of ocean waters during the rise and fall of tides.
- Geothermal Energy- Heat is continuously produced inside the earth which can be used for electricity production.
- Hydel Energy - The use of falling or fast-running water to produce electricity or to power machine.
- Open and closed systems of OTEC – The process that can produce electricity by using the temperature difference between deep cold ocean water and warm tropical surface waters.



SESSION 6: BIOMASS (1 PM to 4 PM)

The sixth session on Biomass was conducted by Mr.A.Elanthiraiyan ,AP/Mech AVIT.
He has shared his outstanding presentation on

- Biomass - Plant or animal material used as fuel to produce electricity or heat.
- Biomass collection – Biomass is collected from waste of Grasses, agricultural crops (such as corn and sugar cane), landfill waste, and manure.
- Energy production from waste- There are number of ways of generating energy from waste. These include combustion, gasification, pyrolysis, anaerobic digestion and landfill gas recovery.
- Opportunities in waste technology- The prospects of Waste Management in our country have reached its highest level today and the field is considered to be a great career option.,
- Biogas preparation from Animal waste, Food waste .wood waste etc – The method of using anaerobic digestion of organic waste (food waste and animal manure) to produce biogas as an alternative process to reduce food waste and generate energy.

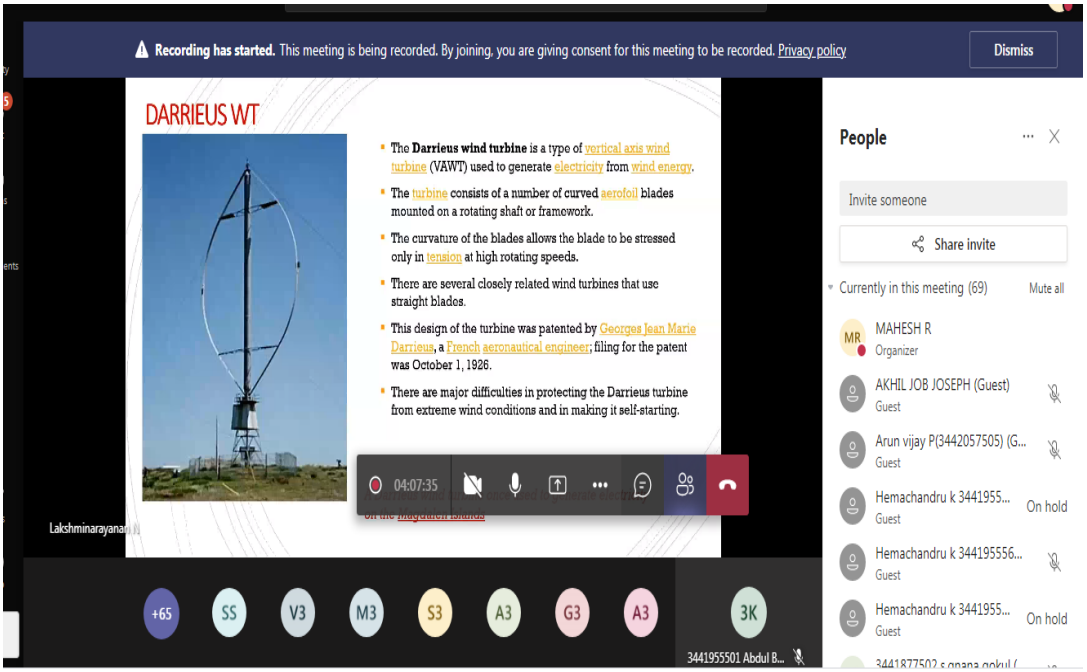


SESSION 7: WIND ENERGY (9 AM to 12PM)

The seventh session on Wind energy was conducted by Dr.J.M.Babu, Prof/Mech, VELTech University.
He has shared his magnificent speech on

- Production of Wind Energy - Wind turbines use blades to collect the wind's kinetic energy**.** The blades are connected to a drive shaft that turns an electric generator, which produces (generates) electricity.
- Design parameters - The turbine performance has been varying with the design parameters such as, pitch angle, number of blades, airfoil type, turbine radius and its chord length.
- Availability - If the turbine is “available” and grid-connected, and the wind and other conditions are within the turbine specification, then power will be generated.
- Types of axis in wind turbines - Horizontal-Axis Turbines and Vertical-Axis Turbines

- Employment opportunities in Wind Energy system - The partial list of the **types** of engineers employed in the **wind** power industry: aerospace engineers, civil engineers, computer engineers, electrical engineers, environmental engineers, health and safety engineers, industrial engineers, materials engineers, and mechanical engineers.



SESSION 8: ENERGY AUDITING (1 PM to 4 PM)

The eighth session on Energy Auditing was conducted by Mr.K.Vijayakumar AP/Mech, AVIT.
He has shared his outstanding speech on

- Energy audit - An inspection survey and an analysis of energy flows for energy conservation in a building.
- Purpose of Energy Auditing- To determine whether your home wastes energy, and to pinpoint where energy is being lost so you can evaluate what measures you can take to make your home more energy efficient.
- Methods and Instruments of Energy Auditing- Like Flue Gas Analysers, Temperature Indicators , Infrared Thermometers , Thermal Insulation scanner ,Steam Trap Monitor Energy consumables
- Utilization of Energy in Industries - Energy is used in the industrial sector for a wide range of purposes, such as process and assembly, steam and cogeneration, process heating and cooling, and lighting, heating, and air conditioning for buildings
- Employment opportunities in Energy Auditing – Job such as assisting in identifying energy efficiency projects, their estimated cost, estimated energy savings, and estimated return on investment for clients. The demand is growing in India.

SESSION 9: HYDROGEN & OXYGEN PRODUCTION (9 AM to 12PM)

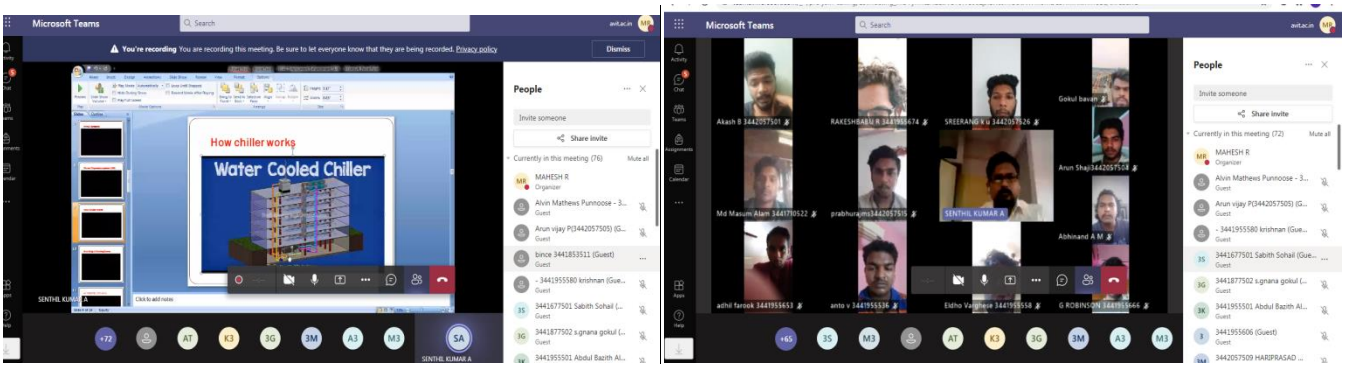
The ninth session on Hydrogen & Oxygen production was conducted by Mr.R.Mahesh,AP/Mech AVIT.
He has shared his fine lecture on

- Hydrogen production - Hydrogen can be produced from diverse, domestic resources including fossil fuels, biomass, and water electrolysis with electricity
- Oxygen production- Oxygen is made in two ways: Medical oxygen, Compressed oxygen
- Methods of Hydrogen production- Natural Gas Reforming/Gasification, Electrolysis, Renewable Liquid Reforming, Fermentation
- Storage systems & devices - Hydrogen can be stored in three ways As a compressed gas in high-pressure tanks, As a liquid in dewars or tanks, As a solid in an alternative chemical form.
- Hydrogen and Oxygen utilization in Cryogenic Engines- Cryogenic engine makes use of Liquid Oxygen (LOX) and Liquid Hydrogen (LH2) as propellants

SESSION 10: AIRCONDITIONING (1 PM to 4 PM)

The tenth session on Air-conditioning was conducted by Mr.ASenthilkumar ,AP/Mech AVIT.
He has shared his excellent articulation on

- HVAC -It stands for heating, ventilation, and air conditioning. This system provides heating and cooling to residential and commercial buildings.
- HAVC Career path in India and worldwide - HVAC technicians are in high demand to build, install, and maintain our constantly evolving systems, and experts predict the demand of HVAC technicians will only rise through 2026
- Types of Air-conditioning systems- There are six types of AC units are the basic central AC, ductless, window unit, portable unit, hybrid, and geothermal
- HVAC Research Industries and career Guidance was given.



End of the session:
Online test was conducted at the end of tenth session.

Outcome:

The programme was conducted on the employability enhancement for Mechanical and Automobile students. The students gained knowledge in Production of energy, Utilisation of energy, Estimation and Cost return investment on Energy Auditing, Bio-fuels, Wind Energy, Solar systems, Refrigeration and Air-conditioning systems and various renewable resources. They received information on various job opportunities in Wind power industry, Aerospace areas, Environmental, Health areas, solar power plants and Energy production Industries. They were provided adequate details on self employment in the same field.

The **Employability Enhancement Skill Development Course** was conducted by **Mr.R.Mahesh,AP/Mech,AVIT.**