Automotive Emissions, Control and Scopes of Alternative Green Fuels (Online)

Overview

Automotive emissions refer to the pollutants released by vehicles during their operation. The primary emissions from internal combustion engine vehicles include carbon dioxide (CO_2), nitrogen oxides (NO_X), particulate matter (PM), volatile organic compounds (VOCs), and carbon monoxide (CO). These emissions contribute to air pollution, climate change, and adverse health effects. Reducing automotive emissions is a critical aspect of mitigating environmental and public health impacts. Emission control technologies have helped reduce emissions from conventional vehicles, but alternative green fuels offer promising solutions to achieve sustainable and cleaner transportation systems. By advancing technology, infrastructure, and policy support, the global automotive industry can move toward a greener and more sustainable future.

Objectives	**(i) Understand Automotive Emission Sources and Impacts** **(ii) Explore Emission Control Technologies** **(iii) Investigate Alternative Green Fuels and their Scopes**	
Modules	**No. of. Lectures: 15 hours** **No. of. Tutorials: 4 hours** **Duration: December 09 to December 13, 2024**	
Who can attend	• Students at all levels (BTech/MSc/MTech/PhD) from India and outside India. • Engineers, researchers and faculty of academic and technical institutions from India and outside India	
Fees	The participation fees for taking the course is as follows: ***B.E./B.Tech Students*: Free** ***M.E/M.Tech Students*: Rs. 590/-** ***Ph.D Scholars*: Rs. 1,180/-** ***Faculties (Academic Institutes) / Scientists (Research Labs)*: Rs. 2,360/-** ***Industry Person*: Rs. 5,900/-** ***Participants from abroad* : US $200**	
Account Detail for Payment of Course Fee	***Bank Name*** : UCO Bank ***Account Name*** : NIT MEGHALAYA R AND D ACCOUNT ***Account Number*** : 23730110010280 ***IFSC Code*** : UCBA0002373 ***MICR No*** : 793028003	
Mode of Registration	**Step-1:** The Course fee is to be deposited online in the aforementioned account. This fee covers the cost of all course materials and access to all the sessions. Participants should pay course fee through online mode (NEFT/IMPS) and identify the transaction ID/details with date.	**Step-2**: After online payment of course fee, fill the google form by scanning this barcode or click on this link:
Important Dates	**Last date of Registration: 24.11.2024** **Intimation of selection: 05.12.2024** **Confirmation of participation: 07.12.2024** **Online link will shared: 08-12-2024**	

Foreign Faculty

Dr. Yang Wenming is serving as Associate Professor in the Department of Mechanical Engineering at National University of Singapore, Singapore. His research interests include Internal Combustion Engines Fueled by Biofuels/Emulsion Fuel/Natural Gas, Combustion and Emissions Control, Waste to Energy and Micro Thermos-Photovoltaic Power Generators.

Guest Faculty

Prof. S. Murugan is a Professor in the Department of Mechanical Engineering at National Institute of Technology Rourkela, India. His research interests are Internal Combustion Engine, Carbon Capture, Cryogenic Treatment, Energy from Waste Recycling and Utilization to name a few.

Host Faculty

Dr. Biplab Kumar Debnath is an Assistant Professor of National Institute of Technology Meghalaya, India. His research interests are Thermal Engineering, Alternative Fuels, Diesel Engine, Solar Thermal Devices and Renewable Energy Systems.

Course Coordinator

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Course Co-coordinator

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For more details click here.

Tentative Schedule

Time / Dates	IST: 9:00 AM to 9:50 AM	IST: 10:00 AM to 10:50 AM	IST: 11:00 AM to 12:00 noon	IST: 3:00 PM to 4:00 PM
09.12.2024 (Monday)	***Lecture 1*** **Topic**: Design and Major Emissions of Various Internal Combustion Engines (YW)	***Lecture 2*** **Topic**: Design and Major Emissions of Various External Combustion Engines (YW)	***Tutorial 1*** **Topic**: Stoichiometry, Dry and Wet Analysis of Rich and Lean Fual-Air Mixture (BKD)	***Lecture 3*** **Topic**: Emission Control Device: PCV Valve, Air Pump, Evaporative Emission Canister (BKD)
10.12.2024 (Tuesday)	***Lecture 4*** **Topic**: Molecular Structures on Soot Formation (YW)	***Lecture 5*** **Topic**: Major Factors Affecting the Performance and Emissions of IC Engine (YW)	***Tutorial 2*** **Topic**: Calculation of Diameter of Injector Nozzle, Ignition Delay, Heat Release Rate (YW)	***Lecture 6*** **Topic**: Catalytic Converter, EGR, SCR, DPF and Other New Emission Control Technologies, Emission Norms (YW)
11.12.2024 (Wednesday)	***Lecture 7*** **Topic**: Future Outlook on Emission Norms, Standardized Test Conditions, Engine Cycles (IDC, WMTC, WHTC, etc.) (YW)	***Lecture 8*** **Topic**: Alternative Green Fuels - I: Scopes, Types and State of the Art (YW)	***Tutorial 3*** **Topic**: Deriving Equilibrium Constant for Adiabatic and non-Adiabatic Chemical Reactions (BKD)	***Lecture 9*** **Topic**: Alternative Green Fuels – II : Dual Fuel Engines (YW)
12.12.2024 (Thursday)	***Lecture 10*** **Topic**: Alternative Green Fuels - III: Hydrogen Production Technologies (SM)	***Lecture 11*** **Topic**: Comparison between Traditional Engine Car, Hybrid Vehicle, Fuel Cell Vehicle and Pure Electric Vehicles (YW)	***Tutorial 4*** **Topic**: Deriving the Expressions of Forward and Reverse Reaction Rtaes, Solving Problems (BKD)	***Lecture 12*** **Topic**: Hybrid Electric Vehicles I: Classifications, Power Transmissions and Battery Evolution (BKD)
13.12.2024 (Friday)	***Lecture 13*** **Topic**: Hybrid Electric Vehicles II: Waste Heat Recovery Options in Fuel Cells (SM)	***Tutorial 5*** **Topic**: Tutorial/ Flip-Discussion/ Homework on Co-existence of Electrical Vehicles and IC Engine Vehicles in Future (YW)	***Examination***	***Valedictory Session***

YW: Dr. Yang Wenming: 9 hrs. lectures and 2 hrs. tutorial
SM: Prof. Sivalingam Murugan: 2 hrs. lectures
BKD: Dr. Biplab Kumar Debnath: 2 hrs. lectures and 3 hrs. tutorial

Please contact Course Coordinator/ Course Co-coordinator in case of any question.