

EEDA



**EXPLORE ENERGY
DIGITAL ACADEMY**



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NEWSLETTER

IN THIS EDITION

EDITORIAL

Words and thoughts from the Editor

URFJ IN CONEM 2024

Participation of URFJ in the 12th National Congress of Mechanical Engineering

ENERGY COURSE AT URFJ

Launch of the new renewable energy course at URFJ

NEWS FROM SRI LANKA

Gas Combustion Remote Laboratory: University Of Moratuwa, Sri Lanka

SRI LANKA FIRST REMOTE LAB

Wind Energy Remote Online Lab and Learnify Modules:



As we move further into the second half of 2024, the Explore Energy Digital Academy (EEDA) continues to evolve, with significant strides made in our mission to advance energy education globally.

This past month has been a testament to the power of collaboration and innovation, showing our community's dedication to promote an inclusive, sustainable future through digital education.

In addition to ongoing projects, we are expanding our academic offerings. New programs are being developed in response to the growing need for specialized knowledge in renewable energy and sustainable practices. These programs are designed to equip students and professionals with the skills required to lead in the energy sector, particularly in emerging markets.

We are also excited to invite contributors within the EEDA network, welcoming educators, researchers, and industry professionals who share our vision. This offers a unique opportunity to be at the forefront of educational transformation, contributing to the development of cutting-edge digital learning resources.

EEDA remains committed to cultivate global partnerships. We invite universities, research institutions, and industry leaders to join us in our mission to democratize energy education. Our collaborative platforms, such as Learnify platform, are open for contributions from experts across the globe. Together, we can continue to push the boundaries of what's possible in digital education.

As always, we extend our gratitude to our partners, contributors, and the entire EEDA community. Your dedication and innovation are what drive our success. Let's continue to work together to shape a more sustainable and educated future.

Stay Connected !!

We encourage you to stay connected with us through our various communication channels. Whether you're interested in our latest research, looking to collaborate, or simply want to keep up with our progress, there's always something new happening at EEDA.

Thank you for being part of this journey.

WORDS FROM

THE EDITOR

Participation of UFRJ in the 12th National Congress of Mechanical Engineering (CONEM 2024)



The National Congress of Mechanical Engineering (CONEM) is an event promoted by the Brazilian Association of Mechanical Engineering and Sciences (ABCM). This year, the congress took place in Natal (Rio Grande do Norte, Brazil), on the Federal University of Rio Grande do Norte campus from July 29 to August 2.

Professor Silvio Carlos Anibal de Almeida's paper "Experimental determination of the polarization curve of a PEM fuel cell" was presented in the plenary session of the congress. The paper describes the Remote Fuel Cell Laboratory, which was developed at UFRJ, for students participating in the Renewable Energy Course promoted by UFRJ and USP who participate in the Europe-Brazil-Bolivia-Cuba Capacity Building Using Globally Available Digital Learning Modules (EUBBC) project.

The discussions during the event sparked a wave of interest among researchers, demonstrating the importance and potential of this project and the use of this equipment to train undergraduate and graduate students.

Advances In The MSc Program In Energy Modelling At UMSS

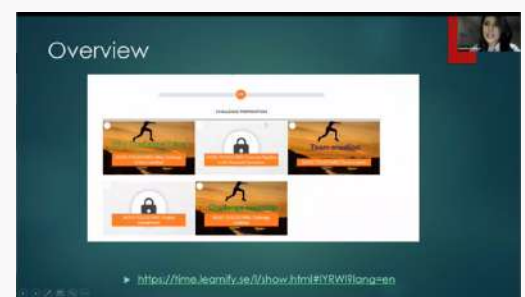
We have the great pleasure of sharing the advances in the MSC program in Energy Modelling at UMSS, which started on June 3rd, 2024.

We have three courses already finished with the participation of 24 professionals in engineering, they have used the Learnify platform actively in the past months and also discussed with National and International experts their insights and learning.

Our EEDA colleague Prof Jordi Olivella has through the EEDA collaboration been appointed as the main teacher in the course Evaluation of Energy Projects that will start in October this year, he will be in contact with the professionals, share his experience in the field and implement in an innovative form the flipped classroom concept.



Start of the Challenge



First meeting with students

LAUNCH OF THE NEW RENEWABLE ENERGY COURSE AT UFRJ

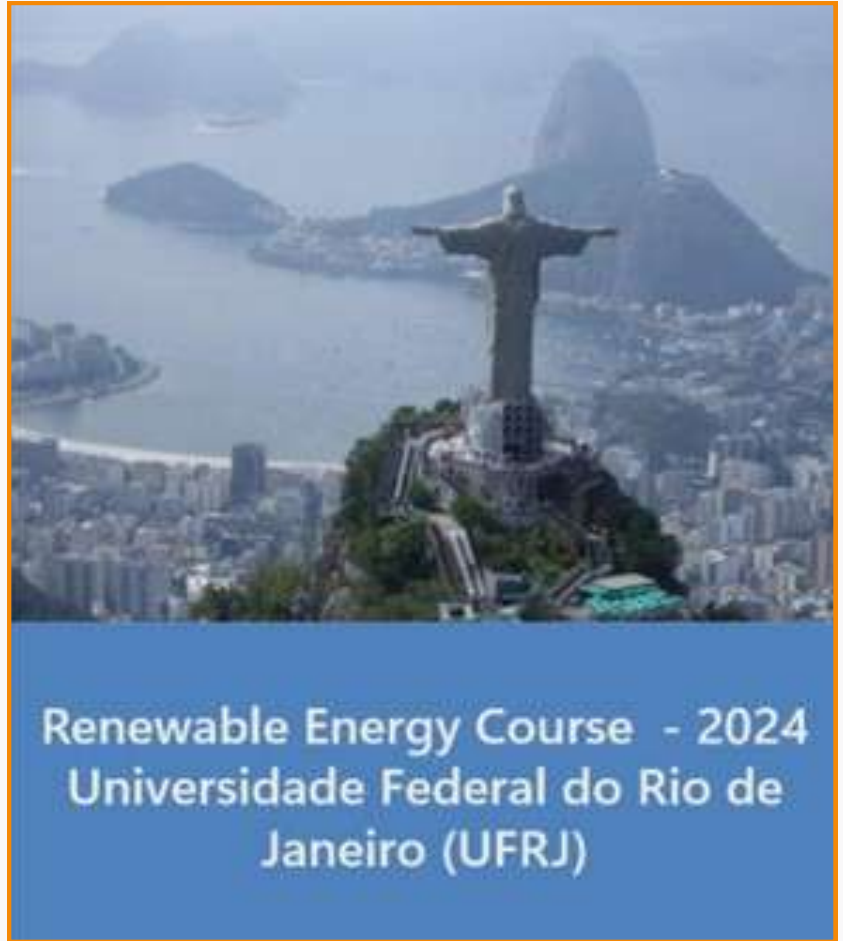
On March 27, 2024 at the Universidade Federal do Rio de Janeiro (UFRJ, Brazil), the Learnify Platform and the Renewable Energy Course were presented. The event organized by the Department of Mechanical Engineering of the Polytechnic School of UFRJ, highlighted the importance of training professionals with the necessary skills to analyze, model and design sustainable and efficient energy systems.

The course was developed within the EUBBC-Digital Project in partnership with UFRJ and USP. Mechanical Engineering, Electronic Engineering and Nuclear Engineering Department students attended the ceremony.

The course was divided into two semesters that included the use of two remote laboratories developed on the Learnify platform:

SA301-T08: Fuel Cell Remote Laboratory (FCRL)

SA301-T04L01 - Remote Lab: Refrigeration and Air Conditioning Systems.



Students enrolled in the first class of the Renewable Energy Course at UFRJ



Screenshots from the modules SA301-T08 & SA301-T04L01

GAS COMBUSTION REMOTE LABORATORY: UNIVERSITY OF MORATUWA, SRI LANKA

The University of Moratuwa (UOM), Sri Lanka, is excited to announce the launch of its Gas Combustion Remote Laboratory.

The Gas Combustion Remote Laboratory was developed under the EUSL-Energy Program, funded by the European Union in 2020-2023. This cutting-edge facility is designed to provide students, researchers, and industry professionals with remote access to advanced gas combustion experiments.

The remote lab is focused in analyzing the fuel gas combustion under various combustion regimes such as variation of air-to-fuel ratio with the temperature profile in the combustion chamber.

To make this reaction efficient, fuel and O₂ should be well mixed to increase the contact area between fuel and O₂ molecules.

Although complete combustion should release only carbon dioxide (CO₂) and water (H₂O), in practice carbon monoxide (CO), CO₂, methane (CH₄), oxides of nitrogen (NO_x), volatile organic compounds (VOCs), and trace amounts of Sulphur dioxide (SO_x), particulate matter (PM) and unburned fuel can be released.

These emissions depend on air/fuel ratio (A/F), temperature, and mixing ability in the combustion chamber.

Lower A/F releases unburned fuel and CO. Higher A/F releases less CO but drops the flame temperature. When air is used instead of pure oxygen, Nitrogen (N₂) in the air will be converted into NO_x.

High A/F will produce more NO_x. Therefore, optimum A/F should be maintained with perfect mixing to achieve a high temperature with less CO and NO_x emission.

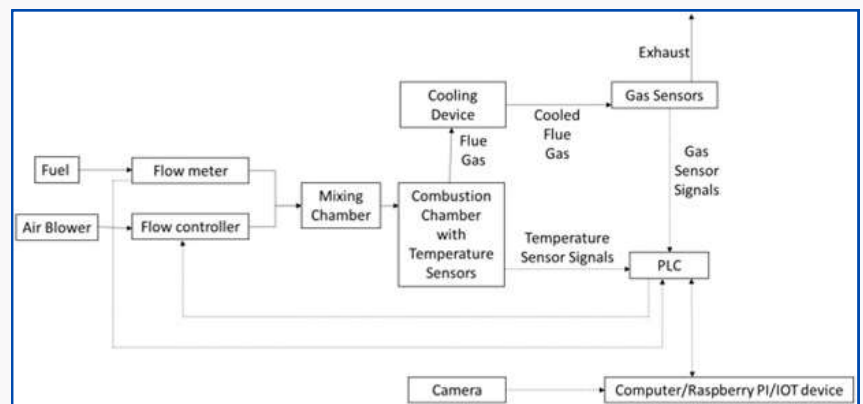


Figure 1. Schematic diagram of the laboratory setup

The Gas Combustion Remote Lab is set to play a pivotal role in shaping the future of gas combustion research and education. As it continues to evolve, UOM aims to expand its capabilities, incorporate new technologies, and foster greater collaboration with academic and industry partners worldwide. The description of the lab is found in the EEDA booking system (Link: Remote Lab Booking).

This lab is available to be run by the teachers/students globally upon request. Please contact Prof. Mahinsasa Narayana (mahinsasa@uom.lk).

WIND ENERGY REMOTE ONLINE LAB: A SRI LANKAN FIRST!

We're thrilled to announce the installation of a state-of-the-art Wind Energy Remote Online Lab at the University of Ruhuna, Galle, Sri Lanka!

This project was cofinanced by EU Erasmus+ Capacity Building for Higher Education grant under the EUSL-Energy Project.

This groundbreaking lab offers an unparalleled opportunity for students, researchers, and enthusiasts worldwide to conduct real-time experiments on both vertical and horizontal wind turbines.

Experience the power of wind from anywhere in the world!

Conduct virtual experiments on demand and gain hands-on experience with wind turbine technology, contributing to renewable energy research.

This lab provides facilities for remote experiments on wind energy generation based on the real-time experimenting by using a domestic scale two wind turbines viz. horizontal wind turbine (300W) and vertical wind turbine (experimental, variable power) integrated to the automated supervisory control and data acquisition (SCADA) system.

The main purposes of WEROL are to conduct experiments for master students on wind power generation, system components, operation, instrumentation, taking measurement and analysis, and simulation, and to conduct research on wind potential analysis and generation for given wind profiles.

For more information please visit our YouTube channel at:

WEROL: Wind Energy Remote Online Lab: A Sri Lankan First!



Dr. K.J.C Kumara showing the wind energy remote lab