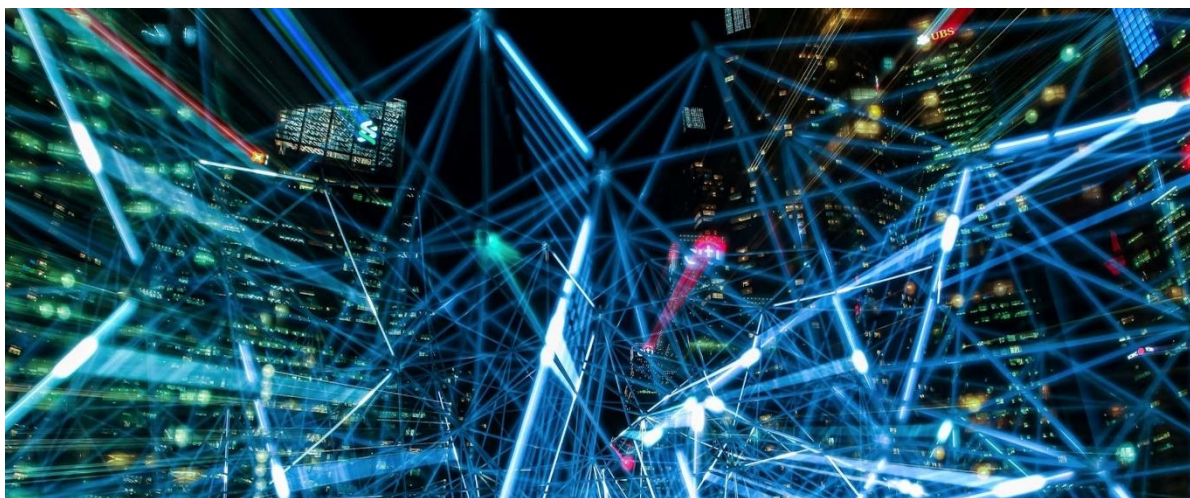# International Winter School on:

"AI-aided Methods for Multiscale Exergy Analysis of Large Complex Systems"

Constanta, Romania
Varna, Bulgaria
Bucharest, Romania

13-17 November 2023

Winter School Aim and Theme	Topics, Lectures and Lecturers
The aim of the Winter School is to offer a holistic approach to the modelling, analysis, optimization and re-engineering of large complex systems and improvement of their energy efficiency based on a multiscale approach. The theme of the Winter School is to apply Exergy Analysis methods for the improvement of energy efficiency and the minimization of environmental impact of different systems starting from processes and equipment, large scale facilities up to regional and national economic systems. The systems that will be studied include Heat Exchangers, Fuel Cells, Batteries, Boilers, Solar Thermal Installations, District Heating Systems, Internal Combustion Engines, Maritime Vessels and National Economies.	***Introduction to Exergy Analysis. Case Studies on Exergy Analysis of different Systems***, Lecturer: **Prof. Enrico Sciubba**, PhD, Ovidius University of Constanta, Romania ***Multiscale Approaches to Energy Efficiency Analysis and Optimization, Exergy Analysis Case Studies on Internal Combustion Engines and Maritime Vessels***, Lecturer: **Prof. Eden Mamut**, PhD, University of Bucharest, Romania ***Fuel Cells and Batteries: Fundamentals, Characteristics and Energy Efficiency***, Lecturers: **Prof. Ioan Stamatin**, PhD, University of Bucharest, Romania & **Cornelia Nichita**, PhD, University of Bucharest, Romania ***Artificial Intelligence-aided Tools for Data Processing***, Lecturer: **Assoc. Prof. Gabriel Prodan**, PhD, Ovidius University of Constanta, Romania
Members of Winter School Committee ➢ *Prof. Enrico Sciubba, PhD, Ovidius University of Constanta, Romania* ➢ *Prof. Eden Mamut, PhD, University of Bucharest, Romania* ➢ *Prof. Ioan Stamatin, PhD, University of Bucharest, Romania* ➢ *Assoc. Prof. Galina Ilieva, PhD, Technical University of Varna, Bulgaria* ➢ *Assoc. Prof. Gabriel Prodan, PhD, OvidiusUniversity of Constanta, Romania* ➢ *Cornelia Nichita, PhD, University of Bucharest, Romania* ➢ *Laurentiu Oancea, PhD, Ovidius University of Constanta, Romania* ➢ *Prof. Roberto Melli, PhD, Ovidius University of Constanta, Romania* ➢ *Cornelia Nichita, PhD, University of Bucharest, Romania*	***Data Centers for Scientific Research and Engineering. Exergy Analysis Case Study on District Heating Plants***, Lecturer: **Laurentiu Oancea**, PhD, Ovidius University of Constanta, Romania ***Building AI Applications. An Introduction to Expert Systems for Engineering***, Lecturer: **Prof. Roberto Melli**, PhD, Ovidius University of Constanta, Romania

Tentative program and schedule

	Monday November 13, 2023	Tuesday November 14, 2023	Wednesday November 15, 2023	Thursday November 16, 2023	Friday November 17, 2023
09:00 – 13:00 (4 hours)	**Opening:** Assoc. Prof. Galina lieva Prof. Enrico Sciubba Prof. Ioan Stamatin Prof. Eden Mamut	**Expert Systems** Prof. Roberto Melli	**ExA 2** Prof. Enrico Sciubba	**ExA of Heat Exchangers** Prof. Enrico Sciubba	**ExA of Maritime Vessel** Prof. Eden Mamut
	ExA 1 Prof. Enrico Sciubba	**Data Centers** Dr. Laurentiu Oancea	**ExA of Internal Combustion Engine I** Prof. Eden Mamut	**ExA of Heat Exchangers** Prof. Enrico Sciubba	**ExA of Thermal Plant** Dr. Laurentiu Oancea
	ExA 1 Prof. Enrico Sciubba	**AI in Energy & Maritime Engineering** Assoc. Prof. Gabriel Prodan	**Fuel Cells & Batteries I** Prof. Ioan Stamatin & Dr. Cornelia Nichita	**Fuel Cells & Batteries II** Prof. Ioan Stamatin & Dr. Cornelia Nichita	**ExA of National Economies Economy** Prof. Enrico Sciubba
	Multiscale 1 Prof. Eden Mamut	**AI in Energy & Maritime Engineering** Assoc. Prof. Gabriel Prodan	**ExA of Internal Combustion Engine II** Prof. Eden Mamut	**Fuel Cells & Batteries II** Prof. Ioan Stamatin & Dr. Cornelia Nichita	**ExA of National Economies** Prof. Enrico Sciubba **Closure**