Digitalization of Thermal Energy Technologies – Modelling and Simulation Methods

Subject area: Mechanical Engineering

University:	DTU
Level:	MA all years
Teaching mode:	hybrid: some students participate online, other students attend real-life
Instructor(s):	Jonas Kjær Jensen

Short description

The aim of the course is to give the students experience in developing numerical models of complex thermal energy technologies such as: heat pumps, organic Rankine cycles, refrigeration systems, gas turbines and industrial process facilities. Further, the students will learn to apply these models to simulate and analyze the technologies in question.

Full description

https://kurser.dtu.dk/course/41417

Learning outcomes

A student who has met the objectives of the course will be able to:
-Develop models of complex thermal energy technologies by utilizing a systematic model development procedure
-Assess the conceptual and numerical validity of the developed models
-Design and assess thermal energy technologies by using simulations of the developed models
-Implement different model complexities i.e. design, operational and transient models
-Select the appropriate model complexity
-Implement different approaches to model component characteristics i.e. empirical or first principle and lumped or distributed models
-Select the appropriate approach to model component characteristics
-Utilize appropriate simulation software to simulate thermal energy technologies
-Apply numerical methods, for solving systems of algebraic, differential and differential-algebraic equations
-Provide constructive peer-feedback on reports and project presentations of fellow students

EuroTeQ Engineering University

General information

Contact hours per week:	4
Total workload:	150 (in student hours for the whole course)
ECTS credits:	5
Language:	English
Course start date:	29 August 2022
Course end date:	02 December 2022
Add. info about start date:	First lecture will on Thursday the 1st of September
Weekly teaching day/time:	Thursdays from 13-17
Time zone:	CET (Denmark, Germany, France, Netherlands, Switzerland, Czech Republic)
Further information:	
Prerequisites:	The students are expected to have a background in engineering thermodynamics and have prior knowledge on heat transfer and fluid mechanics
Activities and methods:	Group work, Exercises, Tutorial sessions
Presence on campus:	

Final examination

Form:	project
Date:	
Location/format:	online
Re-sit possibility:	
Transcript available:	4 weeks after submission of project
Add. info/requirements:	Project to be submitted by course end

Registration

To register for this course, follow the registration requirements of your **home university** as specified here: www.euroteq.eu/courses-registration.

Administration

Number of places:

Minimum participants:

Internal course code: 41417

Contact: jkjje@mek.dtu.dk

This course is part of the EuroTeQ Engineering University joint course catalogue 2022/2023. This is a collaborative activity of the partner universities DTU, L'X, TU/e, TalTech, CTU, TUM as well as Technion. Students from these universities can participate in the offered courses. It is the responsibility of the student to check if you fulfil the requirements to participate in a specific course. Students are also advised to check with their home institution how to get recognition of the ECTS credits gained in courses of the EuroTeQ course catalogue. For further information about EuroTeQ Engineering University, visit www.euroteq.eu or get in touch with the above-mentioned point of contact.