

Bioenergy 2020-2021, 2021-2022

Year 1 at KTH: Department of Energy Technology. Contact: Francesco Fuso-Nerini

Year 2 at Aalto University: Department of Mechanical Engineering. Contact: Mika Järvinen

General program goals:

The purpose of the Nordic Master Program in "Innovative Sustainable Energy Engineering" is to provide state-of-the-art education in the fields of conventional and renewable energy sources like conventional and new power generation, solar energy, biomass energy, wind power, geothermal power, and energy utilization in the built environment by means of economically and environmentally sustainable systems and technologies. The term 'sustainable energy engineering' comprises a wide array of practices, policies and technologies (conventional and renewable/alternative) aimed at providing energy at the least financial, environmental and social cost. A strong emphasis is placed on dealing with energy engineering tasks with due consideration of technical, environmental and socio-economic issues. Another strong emphasis is put on the Innovative and Entrepreneurial aspects of the energy society, especially related to how existing and new efficiency improvement innovations can be brought to the market in different countries. The innovative aspects inside the program are both related to the advanced renewable concept in the Nordic countries as well as regards to new businesses in the energy sector. Advanced methods are applied to identify, describe, quantify and find solutions to a diverse range of energy engineering problems. Participants gain proficiency in project design and implementation, operation and maintenance, as well as in crucial phases of policy generation. Advanced training in a research-oriented perspective is also included.

Cooperating universities:

1. Year	2. Year
<i>KTH</i>	<i>Aalto University</i>
<i>Department of Energy Technology</i>	<i>School of Engineering/Department of Mechanical Engineering</i>
<i>Francesco Fuso-Nerini</i>	<i>prof. Mika Järvinen</i>

Course table:

1. Semester	2. Semester	3. Semester	4. Semester
<i>KTH</i>		<i>Aalto University</i>	
		Bioenergy:	
<i>Introduction to Energy Technology, MJ1402, 3 ECTS</i>	<i>Computational Methods in Energy Technology, MJ2424, 6 ECTS</i>	<i>AAE-E3100 Energy Carriers L, 5 ECTS</i>	Thesis , 30 ECTS
<i>Renewable Energy Technology, MJ2411, 6 ECTS</i>	<i>Energy Management, MJ2410, 6 ECTS</i>	<i>EEN-E1030 Thermodynamics in Energy Technology, 5 ECTS</i>	
<i>Sustainable Power Generation, MJ2405, 9 ECTS</i>	<i>Renewable Energy Technology, Advanced course, MJ2412, 6 ECTS</i>	<i>Energy Markets, EEN-E3006, 5 ECTS</i>	
<i>Sustainable Energy Utilization, MJ2407, 9 ECTS</i>	<i>Applied heat and power technology, MJ2426, 6 ECTS</i>	<i>Process Integration and Energy Optimization, EEN-E3007, 5 ECTS</i>	
<i>Energy and Environment, MJ2413, 6 ECTS</i>	<i>Elective course from list 1</i>	<i>Foreign language studies, LCC..., 3 ECTS</i>	
		<i>Elective courses from list 2</i>	
= 33 ECTS	= 30 ECTS	= 30 ECTS	= 30 ECTS

Elective course list 1

MJ2438 – Modeling of Energy Systems – Heat and Power Generation, 6 ECTS

MJ2476 Strategies in the Global Climate Agenda, 6 ECTS

MJ2477 Energy policy and planning, 6 ECTS

Elective course list 2

Elective courses for Bioenergy module:

PHYS-C6370 Fundamentals of New Energy Sources (5 ECTS) (I-II)

EEN-E1010 Power Plants and Processes (5 ECTS) (I-II)

AAE-E3000 Advanced Energy Project (10 ECTS) (I-II)

AAE-E3080 Thermal Energy Storage Systems L, (IV-V)

EEN-E1040 Measurement and Control of Energy Systems (5 ECTS) (I-II)

EEN-E1000 Introduction to Advanced Energy Solutions (5 ECTS) (I-II)

Kie-98.1114 Communicating Technology (3 ECTS) (I-II, III-IV, IV-V)

Kie-98.1115 Persuasive Communication (3 ECTS) (I-II, III-IV, IV-V)

Kie-98.1410 Industrial Communications (3-5 ECTS) (III)

Possible supervisors for master thesis supervision at Aalto University

Professors at Aalto i.e. 2nd-year university.	Research area
<i>prof. Mika Järvinen, Aalto University, department of Mechanical Engineering</i>	<i>Combustion and gasification, Fuel spraying and modeling</i>
<i>prof. Martti Larmi, Aalto University, department of Mechanical Engineering</i>	<i>Biofuel production and combustion</i>
<i>prof. Risto Lahdelma, Aalto University, department of Mechanical Engineering</i>	<i>Energy: Modeling, Simulation and optimization</i>
<i>Prof. Sanna Syri, Aalto University, department of Mechanical Engineering</i>	<i>Energy market, Societal and economic impact of energy technologies</i>
<i>Prof. Ville Vuorinen, Aalto University, department of Mechanical Engineering</i>	<i>Computational fluid dynamics, Mathematical modelling, Combustion</i>
<i>Prof. Annukka Santasalo-Aarnio, Aalto University, department of Mechanical Engineering</i>	<i>Energy storage systems</i>

Possible supervisors for master thesis supervision at KTH University

Professors and researchers at KTH i.e. 1st-year university.	Research area
Following Professors and Researchers are available in the field of Energy Systems Analysis, Department of Energy Technology, KTH. - Francesco Fuso-Nerini - Francesco Gardumi - Shahid Hussain Siyal - Dimitris Mentis - Constantinos Talitios - Vignesh Sridharan - Alexandros Korkovelos - Georgios Avgerinopoulos	Development of a local, national, regional or global energy assessments. Focusing on relevant issues such as: The role of specific technologies or systems of technologies, the impact on the environment, system economics.