



RTU Course "Heat Supply Systems"

15016 Siltumenerģētisko sistēmu katedra

General data

Code	MSE387
Course title	Heat Supply Systems
Course status in the programme	Compulsory/Courses of Limited Choice; Courses of Free Choice
Course level	Undergraduate Studies
Course type	Professional
Field of study	Heat Engineering, Heat, Gas and Water Technology
Responsible instructor	Turlajs Daniels
Academic staff	Žīgurs Āris Strautmanis Guntis
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN, RU
Possibility of distance learning	Planned
Maximum auditorium capacity	50
Maximum number of students per semester	50
Abstract	The Heat Supply Systems course is based on education and practical appliance of heat production, transmission and consumption technique. The theoretical background of the course is based on traditional and innovative technologies in the field of cogeneration and boiler houses, district heating networking of all dimensions, as well as in-house heating and tap water supply systems. Theoretical skills are strengthened by practical exercises using IT tools for efficiency and appliance calculations. Course supplies the background in national technical and construction code requirements regulating particular business area.
Goals and objectives of the course in terms of competences and skills	To get the knowledge about the principles of district heating establishment, traditional and innovative heating systems, their complex and individual technical and economical characteristics. Influence of individual and complex heating system understanding and knowledge to optimize work programs of heating systems with the aim to improve efficiency of complete system and each component.
Structure and tasks of independent studies	Literature research work for heat supply and generation systems. Heat supply and generation work plan and scheme development. Analysis of heat supply systems using MS EXCEL based programs available from RS and heating equipment suppliers in lecture rooms of heat and power generation department and JSC RIGAS SILTUMS.
Recommended literature	1.M. Rubīna. Siltumapgāde, "Pērse", Rīga, 2003., 172 lpp. 2.P. Randlovs. Centralizētās siltumapgādes rokasgrāmata. E&P, Dānija, 1998., 320 lpp. 3. Ž. Širaks. Siltumapgāde "Liesma", Rīga, 1973., 216 lpp. 4. Е. Я. Соколов. Теплофикация и тепловые сети. М., Энергоиздат, 1982. 1
Course prerequisites	Basics in heat process, IT and economics.

Course outline

Theme	Hours
T1 Introduction into heat generation and supply systems	2
T2 Main heat supply lines	2
T3 Classification of heat consumers	2
T4 Heating and hot water supply for buildings	2
T4.1 Approximate heat loss calculations for buildings	2
T4.2 Heat loss calculations for building envelope	2
T4.3 Tap water consumption determination	2
T4.4 Technical and economical aspects of heat source selection	2
T4.5 Heater selection and capacity requirements	2
T4.6 Classification and schemas of water heating systems	2
T4.7 Hydraulic calculation of water heating systems	2
T4.8 Capacity calculations, design and configuration of heat substations	2
T5 Unconventional kinds of heating for buildings	2
Practical classes and laboratory work	6

Learning outcomes and assessment

Learning outcomes	Assessment methods
To be able to define and select the most suitable heat generation equipment for each specific case, manage elaboration of work programs, evaluation of technical and economical conditions.	Examination: Home work, exam, work Assessment criteria: Able to define the main components of heat generation efficiency and sustainability.

To be able to select and define correct elements and composition of district heating network, as well as principles of network optimization.	Examination: Home work, laboratory/practical work, exam. Assessment criteria: is able to analyze technical and efficiency compliance.
To be able to correctly select corresponding heaters and in-house heating components.	Examination: Home work, laboratory/practical work, exam. Assessment criteria: is able to use correctly and calculate in-house heating components by using heating equipment selection and optimization IT tools.
To be able to evaluate building energy efficiency and compliance of in-house heating system.	Examination: Home works, laboratory/practical work, exam. Assessment criteria: is able to use theoretical background and corresponding IT tools to evaluate building heating compliance.

Study subject structure

Part	CP	ECTS	Hours per Week			Tests			Tests (free choice)		
			Lectures	Practical	Lab.	Test	Exam	Work	Test	Exam	Work
1.	2.0	3.0	2.0	0.0	0.0		*		*		