

## Course description

<b>Course abbreviation:</b>	KKE/TPPS	<b>Page:</b>	1 / 3
<b>Course name:</b>	Combined Heat and Power Generation		
<b>Academic Year:</b>	2023/2024	<b>Printed:</b>	09.07.2025 11:59

<b>Department/Unit /</b>	KKE / TPPS			<b>Academic Year</b>	2023/2024
<b>Title</b>	Combined Heat and Power Generation			<b>Type of completion</b>	Exam
<b>Accredited/Credits</b>	Yes, 4 Cred.			<b>Type of completion</b>	Combined
<b>Number of hours</b>	Lecture 3 [Hours/Week] Tutorial 1 [Hours/Week]				
<b>Occ/max</b>	Status A	Status B	Status C	<b>Course credit prior to</b>	Yes
<b>Summer semester</b>	3 / -	0 / -	0 / -	<b>Counted into average</b>	YES
<b>Winter semester</b>	0 / -	0 / -	0 / -	<b>Min. (B+C) students</b>	10
<b>Timetable</b>	Yes			<b>Repeated registration</b>	NO
<b>Language of instruction</b>	Czech			<b>Semester taught</b>	Summer semester
<b>Optional course</b>	Yes			<b>Internship duration</b>	0
<b>Evaluation scale</b>	1 2 3 4			<b>Ev. sc. – cred.</b>	S N
<b>No. of hours of on-premise</b>					
<b>Auto acc. of credit</b>	Yes in the case of a previous evaluation 4 nebo nic.				
<b>Periodicity</b>	every year				
<b>Specification periodicity</b>					
<b>Substituted course</b>	None				
<b>Preclusive courses</b>	N/A				
<b>Prerequisite courses</b>	N/A				
<b>Informally recommended courses</b>	N/A				
<b>Courses depending on this Course</b>	N/A				

### Course objectives:

The purpose of the subject is to inform about bases of process designing and planning for boiler rooms, power and heating plants, boiler rooms, condensing power plants with heat extraction, incineration plants, alternative heat sources and distribution networks.

### Requirements on student

Active participation in lectures and tutorials, final test and oral exam.

### Content

Topics of lectures according to weeks :

1. Introduction, central heating systems, heat sources of central heating systems
2. Basic principles for the design, needs and consumption of heat in a central heating systems, of thermal load
3. Basic energy relationships, energy conversion, heat transfer and heat exchange
3. Power and heating plants with steam turbines diagrams, choice of steam parameters, choice of the heating coefficient
4. Layout and basic design of power and heating plants, heat accumulation, heat transfer to heat piping networks
6. Condensing power plants with heat extraction, water treatment for heating and power plants

7. Power and heating plants, heating plants and boiler houses, choice of boiler type and number of boilers
8. Power and heating plants with gas turbines, combination of power plants with steam and gas turbines ( layouts and diagrams )
9. Nuclear power and heating plants ( layouts and diagrams )
10. Waste incineration plants, utilization of heat from waste, choice of waste incinerator type and size
11. Diagrams and dimensioning of the heat distribution network, interchange stations in steam and water networks, heat exchangers, consumer heat systems, space heaters, heating radiators
12. Measuring and regulation of heat consumption, heat meters, protecting and signalling devices for interchange stations and heating systems
13. Technical, environmental and economic evaluation of heating systems, heat and fuel consumption, basic design criteria

### Fields of study

### Guarantors and lecturers

- **Guarantors:** doc. Ing. Petr Eret, Ph.D. (100%)
- **Lecturer:** doc. Ing. Petr Eret, Ph.D. (100%), Ing. Vladimír Křenek (100%)
- **Tutorial lecturer:** doc. Ing. Petr Eret, Ph.D. (100%), Ing. Vladimír Křenek (100%)

### Literature

- **Basic:** Vlach, Josef. *Zásobování teplem a teplárenství*. 1. vyd. Praha : SNTL, 1989.
- **Recommended:** Příhoda M., Rédr M. *Sdílení tepla a proudění*. Ostarva, 2008. ISBN 978-80-248-1748-4.
- **Recommended:** Cikhart, Jiří. *Soustavy centralizovaného zásobování teplem*. Vyd. 1. Praha : SNTL, 1977.
- **Recommended:** Polach V. *Teplárenství a potrubní sítě. tabulky*. ZČU, FS-KKE Plzeň, 1993.

### Time requirements

#### All forms of study

Activities	Time requirements for activity [h]
Graduate study programme term essay (40-50)	40
Preparation for an examination (30-60)	50
Preparation for formative assessments (2-20)	20
<b>Total:</b>	<b>110</b>

### assessment methods

#### Knowledge - knowledge achieved by taking this course are verified by the following means:

Oral exam

#### Skills - skills achieved by taking this course are verified by the following means:

Test

#### Competences - competence achieved by taking this course are verified by the following means:

Oral exam

**prerequisite**

**Knowledge - students are expected to possess the following knowledge before the course commences to finish it successfully:**

independently use theoretical fundamentals from branch of fluid mechanics, thermomechanics, mechanics of solids bodies, elasticity and strength of materials for solution and design real technological equipments

**Skills - students are expected to possess the following skills before the course commences to finish it successfully:**

to apply gained knowledges from branch of fluid mechanics, thermomechanics, mechanics of solids bodies, elasticity and strength of materials in the practice for solution and design real technological equipments

**Competences - students are expected to possess the following competences before the course commences to finish it successfully:**

N/A

**teaching methods**

**Knowledge - the following training methods are used to achieve the required knowledge:**

Lecture

**Skills - the following training methods are used to achieve the required skills:**

Practicum

**Competences - the following training methods are used to achieve the required competences:**

Lecture

**learning outcomes**

**Knowledge - knowledge resulting from the course:**

to describe and explain basic diagrams and disposal solution of the heating plants, heat distribution network, interchange stations in steam and water networks and secondary heat networks including all technological equipments

**Skills - skills resulting from the course:**

to design diagrams and disposal solution of heat and power plant, heat distribution network, interchange stations in steam and water networks and secondary heat networks including all technological equipments

**Competences - competences resulting from the course:**

N/A

N/A

**Course is included in study programmes:**

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Design of Power Machines and Equipment	Postgraduate Master	Full-time	Design of Power Machines and Equipment	1	2020	2023	Compulsory courses	A	1	LS