

# Course description

<b>Course abbreviation:</b>	KKE/PTK	<b>Page:</b>	1 / 3
<b>Course name:</b>	Steam Turbines and Condensers		
<b>Academic Year:</b>	2023/2024	<b>Printed:</b>	15.07.2025 21:29

<b>Department/Unit /</b>	KKE / PTK			<b>Academic Year</b>	2023/2024
<b>Title</b>	Steam Turbines and Condensers			<b>Type of completion</b>	Exam
<b>Accredited/Credits</b>	Yes, 6 Cred.			<b>Type of completion</b>	Combined
<b>Number of hours</b>	Lecture 5 [Hours/Week] Tutorial 2 [Hours/Week]			<b>Course credit prior to</b>	Yes
<b>Occ/max</b>	Status A	Status B	Status C	<b>Counted into average</b>	YES
<b>Summer semester</b>	0 / -	0 / -	0 / -	<b>Min. (B+C) students</b>	10
<b>Winter semester</b>	4 / -	0 / -	0 / -	<b>Repeated registration</b>	NO
<b>Timetable</b>	Yes			<b>Semester taught</b>	Winter semester
<b>Language of instruction</b>	Czech			<b>Internship duration</b>	0
<b>Optional course</b>	Yes			<b>Ev. sc. – cred.</b>	S N
<b>Evaluation scale</b>	1 2 3 4				
<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 aim of the course is to provide students with information about design of steam turbines, high-power turbines with reheating steam and saturated steam turbines for nuclear power plants. Also introduce students a various possible design solutions.

## Requirements on student

Active participation in lectures and seminars, writing the final test and oral exam.

## Content

The main content is composed of the influence of inlet parameters and steam reheatin on the cycle efficiency; limit power of the turbine; regenerative heating of feed water; detailed analysis of stage losses; condensation and condensers etc.

## Fields of study

## Guarantors and lecturers

- **Guarantors:** Ing. Marek Klimko, Ph.D. (100%)
- **Lecturer:** Ing. Marek Klimko, Ph.D. (50%), Ing. Petr Kollross, Ph.D. (50%), Dr. Ing. Jaroslav Synáč (100%)
- **Tutorial lecturer:** Ing. Marek Klimko, Ph.D. (50%), Ing. Petr Kollross, Ph.D. (50%)

## Literature

- **Basic:** Ščegljajev, A. V. *Parní turbíny : teorie tepelného děje a konstrukce turbín*. Praha (SNTL - Nakladatelství technické literatury), 1983.
- **Basic:** Bečvář, Josef. *Tepelné turbíny*. 1. vyd. Praha : SNTL, 1968.

- **Extending:** Leizerovich, A. Sh. *Steam Turbines for Modern Fossil-Fuel Power Plants*. USA, 2017. ISBN 0-88173-548-5.
- **Recommended:** Škopek J. *Soubor konstrukčních tabulek*.

## Time requirements

### All forms of study

Activities	Time requirements for activity [h]
Preparation for an examination (30-60)	40
Preparation for comprehensive test (10-40)	25
Contact hours	91
<b>Total:</b>	<b>156</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:

Skills demonstration during practicum

Individual presentation at a seminar

Written exam

### 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:

to know the general principles of design of machine components on the basis of theoretical knowledge of machine and equipment design, mechanics and elasticity and strength

to use independently theoretical knowledge of the theory of flow machines

to explain the theory of the simple thermal cycle of a steam turbine (Rankine cycle)

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

to perform basic stress calculations of machine parts based on the theory of mechanics and elasticity and strength

to be familiar with the water vapour property diagram (h-s diagram)

to calculate the simple heat cycle of a steam turbine (Rankine cycle)

to use the possibilities of computer tools (Excel)

### 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

Interactive lecture

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

Lecture

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

- to describe the physical processes associated with the flow and energy transformations in a steam turbine
- to divide losses in the flow section of a steam turbine and know how to minimize them
- to describe in detail the various components of a steam turbine including condensation and regeneration accessories and know how to their design and any design constraints
- to explain the commissioning and servicing procedures for steam turbines
- to describe the specifics of turbines designed for continuous operation with saturated steam, including erosion issues

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

- to apply theoretical knowledge in the field of steam turbines in draft design, including the design of all their key components
- to perform complex steam turbine cycle calculations in a spreadsheet environment (Excel)
- to perform simplified computational design of condensation and regeneration equipment
- to analyze individual solution to steam turbine design
- to estimate further developments in steam turbine design

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

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	2	ZS
Design of Power Machines and Equipment	Postgraduate Master	Full-time	Nuclear Power Equipment Design	1	2020	2023		Compulsory courses	A	2	ZS