OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

CHAIR
OF THERMODYNAMICS
AND COMBUSTION

Thermal Power Plants

Environmental and Energy Process Engineering, Industrial Engineering for Chemical and Energy Engineering

Thermal power plants

Students are able to calculate key performance and evaluation parameters including the thermal efficiencies of the differe processes for producing mechanical power from heat. The students know everything about the advantages and disadvantages the method as well as their economic conditions. The method can be evaluated ecologically in terms of energy consumption a CO2 emissions.

- the energy conversion as the basis for the evolution of humanity and the impact on the environment , global energy consumption , the evolution of energy consumption in Germany , Principal possibilities of energy conservation
- fossil fuels , combustion technology efficiency , emissions
- engine power conversion , premixed flames, diffusion flames , engine concepts , thermal efficiencies , diesel engine
- Spark-ignition engine , ignition, combustion , gas engine , gas turbine
- Basics of cycle processes to generate electrical energy : Carnotisierung , process characteristics , principle of regeneration , applying the calculation programs of Wagner to describe the state of water behavior by IAPWS - I 97 (industry standard)
- Combined cycle : cycle characteristic , possibilities of improvement in efficiency , regenerative feed water , reheat , supercritical operation
- Steam turbines : diagrams and energy flow charts , steam - generator , losses , gas treatment and environmental aspects , efficiencies and technical level
- Combination processes : Energetic assessment , basic circuits, efficiency and technical level
- Cogeneration : Separate and combined generation of heat and electricity , needs analysis , power to heat ratio , basic circuits heat and power led driving, steam turbines for heat extraction (back pressure and condensing extraction plant) , CHPs with piston engines and gas turbines , thermodynamic evaluation and environmental aspects
- Cost of electricity

Lecture with exercises

Thermodynamics , physical chemistry , fluid mechanics

examination 120 min / 5 CP

- 4 SWS
- Attendance : 56 hours
- Self-study: 94 hours

Dr.-Ing. J. Sauerhering (Lehrende: Dr.-Ing. J. Sauerhering, Prof. Dr.-Ing. E. Specht)

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