

Module Name	Technologies for Waste Heat Utilisation
Module Number	Eul-RES-E-TAbw
Responsible Lecturer	Prof. Christiane Thomas christiane.thomas@tu-dresden.de
Qualification Objectives	Students master selection and integration methods for technologies aimed at the thermal utilization and power generation from low- and high-temperature waste heat potentials. Specifically, students acquire in-depth knowledge in the areas of heat pumps, including high-temperature heat pumps, sorption systems, Organic Rankine Cycle, Clausius Rankine Cycle, and supercritical CO ₂ cycle processes, as well as the working fluids and components required for these processes.
Contents	The module covers the thermal utilization of low- and high-temperature waste heat for conventional heat pump processes, high-temperature heat pumps, and sorption processes. Additionally, it includes heat-power processes for waste heat power generation, such as the Clausius Rankine Cycle, Organic Rankine Cycle, and supercritical CO ₂ processes. Other topics include pinch analysis, characterization, requirements, and selection criteria for working fluids, the design and dimensioning of cycle processes and their components, process management, including machinery and plant technology, as well as energy-economic evaluation, operating conditions, and calculation tools.
Teaching and Learning Forms	3 hours per week of lectures, 2 hours per week of exercises, and self-study.
Prerequisites for Participation	The competencies to be acquired in the modules Fundamentals of Power Machinery as well as Principles of Refrigeration, Air Conditioning, and Heat Pumps are required.
Usability	The module is an elective module from the elective area "Competence Deepening" according to § 6 paragraph 3 SO and § 33 paragraph 3 PO in the main study phase of the diploma program Regenerative Energy Systems.
Prerequisites for the Award of Credit Points	Credit points are awarded when the module examination is passed. The module examination consists of a written exam lasting 180 minutes. If fewer than seven students are registered, the written exam will be replaced by a non-public oral examination as an individual exam lasting 40 minutes. If applicable, this will be announced to the registered students at the end of the registration period in the usual manner. Bonus credits for the written exam include e-assessments with a workload of 10 hours.
Credit Points and Grades	5 credit points can be earned through the module. The module grade corresponds to the grade of the examination performance.
Frequency of the Module	The module is offered every winter semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.