

Module Name	Aerospace Engineering - Advanced
Module Number	Eul-MT-E-A06V2
Responsible Lecturer	Dr. Tino Schmiel tino.schmiel@tu-dresden.de
Qualification Objectives	Students are familiar with the components required for supplying a spacecraft with electrical power, such as energy conversion, regulation, conditioning, distribution, and storage. They are capable of considering the requirements of the spacecraft's systems and designing the individual tasks within the energy system. They understand the operational limits and special developments in the fields of solar cells, primary and secondary batteries, fuel cells, thermoelectric converters, and nuclear systems. They can evaluate and design these systems while taking into account the requirements of the spacecraft. Furthermore, students are familiar with the space-specific requirements for electronics and software.
Contents	The module covers the requirements for energy supply, conditioning, storage, and the provision of electrical power. Key topics include the configuration of an energy system, nuclear fission and fusion, radioisotope generators, nuclear reactors, thermoelectric converters, thermionic converters, thermophotovoltaic converters, photovoltaic generators, solar dynamic generators, chemical batteries and accumulators, fuel and electrolysis cells, as well as system-level considerations for spacecraft and mobile autonomous systems. The module includes design calculations, the development of electronics for space systems, and electronics-specific requirements and standards (e.g., interference-resistant circuit design and electromagnetic compatibility).
Teaching and Learning Forms	3 hours per week of lectures, 1 hour per week of exercises, and self-study.
Prerequisites for Participation	The competencies acquired in the module Fundamentals of Aerospace Engineering are required.
Usability	The module is an elective module within the elective area "Methods and Applications" according to § 6 (3) SO and § 33 (3) PO of the main study program in the diploma program Mechatronics. It creates the prerequisites for modules that list this module in the field "Prerequisites for Participation."
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.
Credit Points and Grades	7 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 210 hours.
Duration of the Module	The module lasts one semester.