

Module Name	Measurement Technology
Module Number	Eul-RES-C-MessT
Responsible Lecturer	Prof. Stefan Odenbach studiendokumente.mw@tu-dresden.de
Qualification Objectives	Based on their knowledge of measurement principles, methods, and procedures, students are able to design, set up, evaluate, and apply suitable measurement setups for the physical quantities and process parameters relevant to mechanical engineering, such as strain, temperature, current, voltage, and electrical resistance, using appropriate intermediate circuits. Students understand how to represent the dynamic processes of engineering sciences through idealized signal transmission elements as a function of time and frequency and how to combine transmission elements. They are capable of determining and evaluating the static and dynamic behavior of signal transmission elements and measurement systems from all areas of mechanical engineering in conjunction with typical mechanical engineering model arrangements.
Contents	The module covers the fundamentals of measurement technology. This includes the consideration of measurement uncertainties, the measurement of electrical and non-electrical quantities, sensor technology, and the description of the dynamic behavior of all systems relevant to mechanical engineering using linear system theory in both the time and frequency domains. The focus in the analysis of dynamic systems is on systems whose dynamics can be described in time using first-order differential equations. The content also includes the creation of signal flow diagrams, the analysis of linear and non-linear characteristics of transmission elements, and basic knowledge of analog-to-digital signal conversion and its digital processing.
Teaching and Learning Forms	2 hours per week of lectures, 1 hour per week of exercises, 1 hour per week of practical sessions, and self-study.
Prerequisites for Participation	The competencies to be acquired in the modules Basics of Electrical Engineering, Introduction to Analysis and Algebra, Multidimensional Differential and Integral Calculus, and Physics are required.
Usability	The module is a compulsory module in the diploma program Renewable Energy Systems. It creates the prerequisites for the 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 portfolio with a workload of 75 hours. Bonus achievements for the portfolio include performance assessments with a workload of 15 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.