

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Name</b>                                  | <b>Measurement and Sensor Technology</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Module Number</b>                                | Eul-ET-C-MuST, Eul-IST-E-MuST, Eul-MT-E-MuST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Responsible Lecturer</b>                         | Prof. Dr.-Ing. habil. Jürgen Czarske<br>juergen.czarske@tu-dresden.de                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Qualification Objectives</b>                     | After completing the module, students master the fundamental principles of digital, particularly optical, measurement methods, as well as various methods for evaluating harmonic and noisy signals. They are capable of designing neural networks for various image processing disciplines and applying them.                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Contents</b>                                     | The module covers the principles of digital optical measurement technology and deep learning, as well as the practical application of neural networks for image processing or analog and digital measurement methods.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Teaching and Learning Forms</b>                  | 2 hours per week of lectures, 1 hour per week of exercises, 1 hour per week of practical lab courses, and self-study.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Prerequisites for Participation</b>              | Knowledge of physics at advanced high school level (Abitur Leistungskurs) and the competencies acquired in the module "Systems Theory" are required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Usability</b>                                    | The module is a compulsory module in the main study program of the specialization Automation Technology and Robotics in the diploma program Electrical Engineering. Furthermore, it is an elective module in the elective area "Orientation" according to § 6 paragraph 3 SO and § 33 paragraph 3 PO of the main study program in the diploma program Information Systems Engineering. Additionally, it is an elective module in the elective area "Methods and Applications" according to § 6 paragraph 3 SO and § 33 paragraph 3 PO of the main study program in the diploma program Mechatronics. It creates the prerequisites for the modules that list this module in the field "Prerequisites for Participation." |
| <b>Prerequisites for the Award of Credit Points</b> | Credit points are awarded when the module examination is passed. The module examination consists of a written exam lasting 120 minutes and a portfolio with a workload of 20 hours. The written exam is mandatory for passing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Credit Points and Grades</b>                     | 5 credit points can be earned through the module. The module grade is determined by the weighted average of the grades of the examination components. The written exam is weighted fourfold, and the portfolio is weighted singly.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Frequency of the Module</b>                      | The module is offered every summer semester.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Workload</b>                                     | The total workload is 150 hours.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Duration of the Module</b>                       | The module lasts one semester.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |