

# Course Manual MT

Measurement Technology

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## – General information

**Long name** Measurement  
Technology

**Approving CModule** [MT BaET](#), [MT BaTIN](#)

**Responsible** Prof. Dr. Michael  
Silverberg  
Professor Fakultät IME

**Valid from** summer semester 2022

**Level** Bachelor

**Semester in the year** summer semester

**Duration** Semester

**Hours in self-study** 60

**ECTS** 5

**Professors** Prof. Dr. Michael  
Silverberg  
Professor Fakultät IME

**Requirements** MA1, MA2, GE1, GE2

**Language** German

**Separate final exam** Yes

## Literature

Schrüfer, E.: Elektrische Messtechnik

Lerch, R.; Kaltenbacher, M.; Lindinger, F.: Übungen  
zur Elektrischen Messtechnik

Felderhoff, R.: Elektrische und elektronische  
Messtechnik

Weichert, N.: Messtechnik und Messdatenerfassung

## Final exam

**Details** Written module  
examination

**Minimum standard** -

**Exam Type** EN Klausur

## – Lecture / Exercises

### Learning goals

Goal type	Description
Knowledge	General considerations Historical review The SI system Measurement techniques
Knowledge	Known systematic measurement deviations Unknown systematic measurement deviations Reproduction of systematic measurement errors Random measurement errors Complete measurement result
Knowledge	Random experiments Relative frequency The Laplace Experiment Conditional probability Independent events
Knowledge	Random variable Distribution function and distribution density function Expected value, variance and standard deviation Central limit theorem, normal distribution and uniform Distribution Sample of a measurand Confidence interval for the expected value Propagation of random deviations Linear Regression
Knowledge	Properties of electrical measuring instruments Moving-coil movement Electrodynamic movement Moving iron movement Measuring range extension for DC voltage measurement Measuring range extension for direct current measurement Limiters Alternating current and alternating voltage measurement

### Special requirements

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<b>Accompanying material</b>	electronic lecture slides for the lecture, electronic exercise collection, Scriptum
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<b>Separate exam</b>	No
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Knowledge    Sampling and reconstruction  
A/D and D/A converters  
Digital Multimeter  
Logical basic gates  
Memory elements and counters  
Digital timing measurement  
Digital frequency measurement  
Digital Oscilloscopes

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Knowledge    Resistance determination  
Measuring bridges  
Sensors supplying voltage and  
current  
Resistive sensors  
Pulsed sensors

### Expenditure classroom teaching

<b>Type</b>	<b>Attendance (h/Wk.)</b>
Lecture	2
Exercises (whole course)	2
Exercises (shared course)	0
Tutorial (voluntary)	0

## – Practical training

### Learning goals

Goal type	Description
Knowledge	Understanding and using digital oscilloscopes
Knowledge	Analyzing of limiter circuits
Knowledge	Analysis of galvanic, magnetic and capacitive couplings

### Special requirements

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<b>Accompanying material</b>	Experimental instructions
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<b>Separate exam</b>	No
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### Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	1
Tutorial (voluntary)	0