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| **Course code** | CTU01 |
| **Course title** | Metrology of Electrical Quantities |
| **Institution** | Czech Technical University in Prague |
| **Course address** | Czech Technical University, Faculty of Electrical Engineering,  Technicka 2, CZ-166 27 Prague 6, Czech Republic |
| **City** | Prague |
| **Minimum year of study** | 4th year |
| **Minimum level of English** | Good |
| **Minimum level of French** | None |
| **Keywords** | Metrology, calibration, standards of electrical quantities, ratio devices, measurement methods. |
| **Language** | English |
| **Professor responsible** | Jaroslav Bohacek |
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| **Participating professors** | Radek Sedlacek, Martin Simunek, Jan Kucera |
| **Number of places** | Minimum: 10, Maximum: 18, Reserved for local students: 0 |
| **Objectives** | To present an overview of modern and perspective methods for precision measurement of electrical quantities, to demonstrate various techniques used in calibrations of electrical measurement instruments and standards. After a brief introduction devoted to fundamental problems of metrology, the explanation is focused on facilities and methods for precision measurement of electrical quantities. Possibilities of application of Josephson arrays and quantum Hall effect devices to precision measurement of current, voltage, resistance and capacitance are discussed. |
| **Program to be followed** | Four 4-hour lectures:  1. Metre Convention. Measurement units and measurement standards. Quantum standards of voltage and resistance. Thompson-Lampard's capacitance standard. Transfer standards. 2. Voltage and current inductive ratio devices and optimization of their metrological parameters.  3. Methods for precision measurement of DC current and DC voltage. Josephson potentiometers. Measurement of voltage, power and energy in audio frequency range.  4. Measurement of resistance, capacitance and inductance (bridges and three-voltage method). Metrological application of the quantum Hall effect (QHE).  Three 2-hour laboratory demonstrations: 1. Thompson-Lampard's capacitance standard. 2. Frequency performance of resistance standards. 3. Calibration of capacitance boxes.  4-hour visit to the Czech Metrology Institute: Calibration of digital multimeters, QHE-based calibration of resistance standards. |
| **Prerequisites** | Basic courses of applied physics and electric circuit theory. |
| **Course exam** | Continuous evaluation through laboratory exercises and an evaluation test at the end of the course. |
| **Publish on the web** | Yes |
| **Session** | November 2017 |
| **Created at** | June 7, 2017 |
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