Course description

| Course abbreviation: | KTO/DM | | | | | Page: | 1/3 |
|------------------------------------|--|-----------------|------------------|---------|------------------------|------------|-------|
| Course name: | Metrology | | | | | 8 | - / - |
| Academic Year: | 2023/2024 | | | | Printed: | 14.07.2025 | 23:08 |
| | | | | | | | |
| Department/Unit / | KTO / DM | | | | Academic Year | 2023/2024 | |
| Title | Metrology | | | | Type of completion | Exam | |
| Accredited/Credits | Yes, 6 Cred. | | | | Type of completion | Combined | |
| Number of hours | Lecture 3 [Ho | urs/Week] Tutor | rial 3 [Hours/We | ek] | | | |
| Occ/max | Status A | Status B | Status C | | Course credit prior to | Yes | |
| Summer semester | 0 / - | 0 / - | 0 / - | | Counted into average | YES | |
| Winter semester | 10 / - | 0 / - | 2 / - | | Min. (B+C) students | 10 | |
| Timetable | Yes | | | | Repeated registration | NO | |
| Language of instruction | Czech, Englis | h | | | Semester taught | Winter, Su | mmer |
| Optional course | Yes | | | | Internship duration | 0 | |
| Evaluation scale | 1 2 3 4 | | | | Ev. sc. – cred. | S N | |
| No. of hours of on-premise | | | | | | | |
| Auto acc. of credit | Yes in the case of a previous evaluation 4 nebo nic. | | | | | | |
| Periodicity | every year | | | | | | |
| Specification periodicity | | | | | | | |
| Substituted course | None | | | | | | |
| Preclusive courses | N/A | | | | | | |
| Prerequisite courses | N/A | | | | | | |
| Informally recommended courses N/A | | | | | | | |
| Courses depending | on this Course | KTO/ZSZT3, K | KTO/ZSZT4, KT | O/ZSZT5 | | | |

Course objectives:

Achieving expertise in engineering metrology company, including primary legislation, basic principles and areas of measurement: length, angle, shape and position variations, surface textures and threads.

Requirements on student

Conditions for obtaining credit and exam:

1)Development of protocols from a randomly selected measurement

- 2)Passing a written test
- 3)Written exam
- 4)Oral exam

Content

1)Metrology, structure metrology, legal metrology, Act No. 505/90 Coll. metrology, metrology related to quality management 2)Basic concepts of metrology, an introduction to the theory of measurement, causes and measurement errors, measurement accuracy and factors causing measurement inaccuracy

3)Length measurements, units of measurement - development, methods of measurement. Gauges and instruments for measuring length

4)Measurement of angles, angles metrology unit, an overview of gauges for measuring angles, measuring methods, measuring very small angles, cones and perpendicularity

5)Measurement deviations of shape and position, straightness and flatness, measurement and control profile, roundness, cylindrical, throw, play

6)Measurement of threading, fitting, and functional elements of the kinds of threads, thread control complex, elementary measurement coils, the specifics of control ball screw

7)Measurement of gears, gear types, kinematics of the tooth and the impact on the measurement requirements

8)Measurement of surface roughness, surface finish classification, comparing control processing, instruments for measuring surface roughness, roughness parameters, curve Abottova support section, New Directions in roughness

9)Geometric precision engineering equipment, protocols, precision inspection equipment such as a complex activity and safety features, performance and job testing and documentation

10)Laser measuring technology, theory and possibilities Laserinterferometers laser technology, laser holography in metrologiie 11)Automation of measurement, automation devices, sensors - principles and types, applying physical principles and methods for design automation of measurement strategies

12)Measurements in non-production stages, the requirements for placement machine foundation stiffness of machine tools, the development of new measurement methods, measurement of R & D

13)Requirements for engineering metrology, standards of EN 45000, accreditation měrových centers, business centers in metrology, metrology organizations in the enterprise, time control gauges. Using unconventional materials metrology, requirements for qualification metrology, the role of education

http://books.fs.vsb.cz/StrojMetro/strojirenska-metrologie.pdf

Fields of study

Guarantors and lecturers

- Guarantors: doc. Ing. Martin Melichar, Ph.D. (100%)
- Lecturer: doc. Ing. Martin Melichar, Ph.D. (50%)
- Tutorial lecturer: Ing. Jan Kutlwašer, Ph.D. (100%), doc. Ing. Martin Melichar, Ph.D. (50%)

Literature

| • Basic: | Metrologie v kostce III. (ÚNMZ) - |
|--------------------------------|---|
| | http://www.unmz.cz/sborniky_th/sb2009/MvK_7_vidit_hypervazby_small.pdf > |
| Extending: | Olga Tůmová. Metrologie a hodnocení procesů. Praha, 2010. ISBN 978-80-7300-2. |
| • Recommended: | Jaroslav Boháček. Metrology. Praha, 2013. ISBN 978-80-0105-351 |

Time requirements

All forms of study

| Activities | | Time requirements for activity [h | | | |
|---|----------------|-----------------------------------|--|--|--|
| Contact hours | | 78 | | | |
| Undergraduate study programme te 40) | erm essay (20- | 40 | | | |
| Preparation for an examination (30 | -60) | 40 | | | |
| Preparation for laboratory testing; of analysis (1-8) | outcome | 8 | | | |
| | Total: | 166 | | | |

assessment methods

Knowledge - knowledge achieved by taking this course are verified by the following means:

Oral exam

Written exam

Skills - skills achieved by taking this course are verified by the following means:

Seminar work

Skills demonstration during practicum

Competences - competence achieved by taking this course are verified by the following means:

Oral exam

Knowledge - students are expected to possess the following knowledge before the course commences to finish it successfully:

Describe theory of measurements with common communal gauges (lenght, angle)

Describe the theory of basic measurement errors

Describe basic metrological legislative requirements (according rule 505/1990)

Skills - students are expected to possess the following skills before the course commences to finish it successfully:

Solve metrological applications on basic gauges (lenght,angle)

Control the basic length and angle gauges

Read basic length and angle gauges

Competences - students are expected to possess the following competences before the course commences to finish it successfully:

N/A

teaching methods

Knowledge - the following training methods are used to achieve the required knowledge:

Lecture

Practicum

Laboratory work

Self-study of literature

Skills - the following training methods are used to achieve the required skills:

Practicum

Competences - the following training methods are used to achieve the required competences:

Lecture supplemented with a discussion

learning outcomes

Knowledge - knowledge resulting from the course:

describe metrological activities in the company

interpretation measurement results (length, angle, GOM)

requirements for measurement processes and measurement equipment (length, angle, GOM)

Skills - skills resulting from the course:

to carry out measurements of the dimensional and qualitative characteristics of the components (length, angle, GOM)

use gauges to carry out measurement tasks (length, angle, GOM)

Adjust gauges before use (length, angle, GOM)

Competences - competences resulting from the course:

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|---|----|---|---|
| | | | |

N/A

Course is included in study programmes:

| Study Programme | Type of | Form of | Branch | Stage St. plan v | Year | Block | Status | R.year | R. |
|--|-------------------------|-----------|--|------------------|------|-----------------------|--------|--------|----|
| Engineering | Bachelor | Full-time | Quality Control | 1 2020 | 2023 | Compulsory courses | А | 2 | LS |
| Machining, Additive Technology and Quality Assurance | Postgraduat e Master | Full-time | Machining, Additive Technology and Quality Assurance | 1 2020 | 2023 | Compulsory courses | А | 1 | ZS |
| Certifikátové programy | Postgraduat e Master | Full-time | Quality Control | 1 1 | 2023 | Core elective courses | В | | ZS |