

Course Description

Discipline/Course: NON-ELECTRICAL VALUES MEASUREMENT

The Basic Educational Program specialty: INSTRUMENTMAKING

The department of physical methods and quality control devices

Instructor: Evgeny M. Fedorov, PhD

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Learning Outcomes:

Theory and practice of methods and use of means of measuring physical quantities of any nature using modern information technologies;

at the level of reproduction:

Theoretical knowledge in the field of physical fundamentals, internal structure, typical designs, practical application of converters and sensors for measuring non-electrical quantities..

at the level of understanding:

Basis for measuring non-electrical quantities. Purpose and classification of the main characteristics of converters, sensors.

Practical skills:

The ability of independent application of the received theoretical knowledge in practice at practical realization of devices and devices solving problems of the control of non-electric quantities..

Course Outline:

Theoretical section:

- Section 1. Introduction to the theory of measuring non-electrical quantities. Transducers, sensors: purpose, classification and main characteristics
- Section 2. Interface Electronic Circuits measuring transducers and sensors
- Section 3. Measurement of thermal quantities
- Section 4. Methods and means of measuring pressure
- Section 5. Levelmetry
- Section 6. Measurement of Light Quantities. Optoelectronic sensors and converters
- Section 7. Flow measurement
- Section 8. Measurement of motion parameters. Position, displacement speed and acceleration

Practical section:

List of laboratory works

1. Measurement of the dynamic magnetic characteristics of ferromagnetic materials.
2. Investigation of the properties of thermal measuring converters.
3. Investigation of resistive measuring transducers.

4. Investigation of strain gauge transducers.
5. Investigation of the properties of capacitive measuring converters.
6. Investigation of photoelectric converters.

Course Delivery: one semester, 18 weeks

Prerequisites: "Mathematics", "Physics", "Electrical engineering", "Electronics and microprocessor technology", "Metrology, standardization and standardization", "Physical basis for obtaining information".

Co-requisites: "Analog measuring devices", "Digital measuring devices", "Microprocessor means and systems", "General theory of measurements", "Computer and computing facilities in measuring technology".

Final Assessment: exam, course project

Course Developer: Evgeny M. Fedorov, PhD