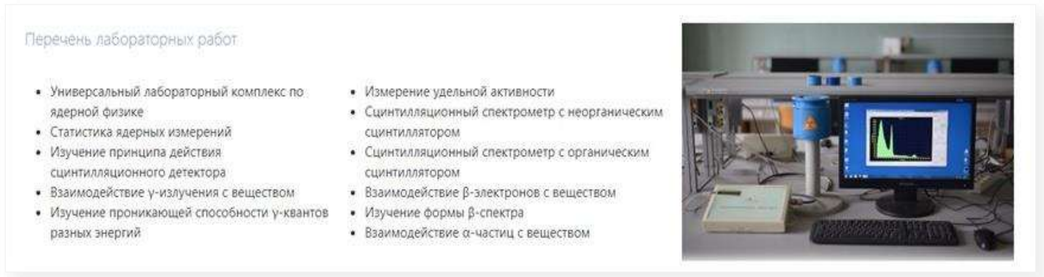
On-line laboratory works for PGEC

Online laboratory “Physics of a nucleus and ionizing radiation”

Introduction

The training module contains full description of the set-up, software for the experimental data primary processing, software MathCad



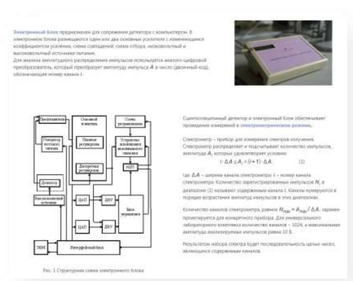
Universal laboratory set-up. It consists of detector, electronic module, personal computer and is designed to carry out laboratory works at one experimental unit

◦ Detector

Contains replaceable blocks for detection and measurement of α-, β-, γ- radiation, and basic unit for transformation of light signal to an electric one with consequent formation and amplification of it. Each replaceable block has accessories providing space configuration of an experiment and shielding against radiation

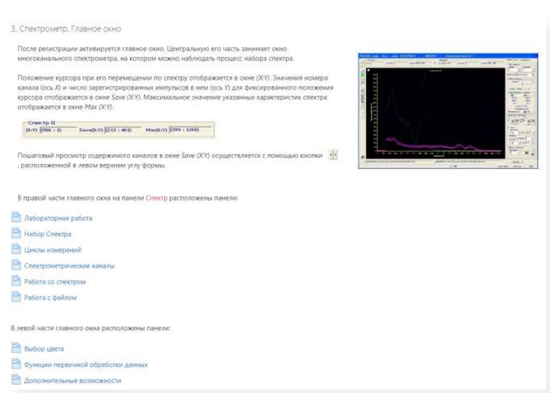
◦ Electronic module

It is used to transform the detector signal to a digital form recognizable by a computer

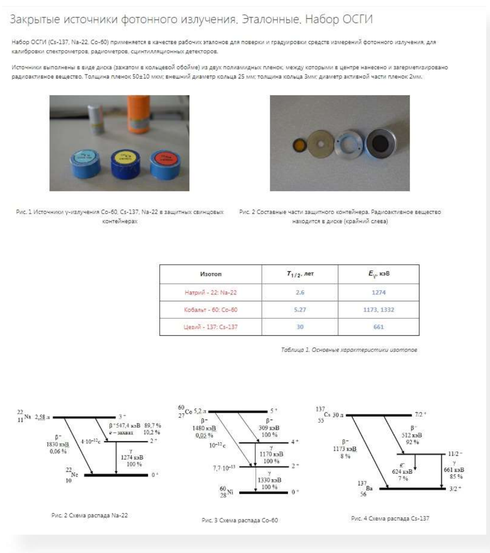


◦ Software “Spectrum” (Atomtex production)

It is used to set up and control the spectrometer parameters, parameters of an experiment and primary data processing

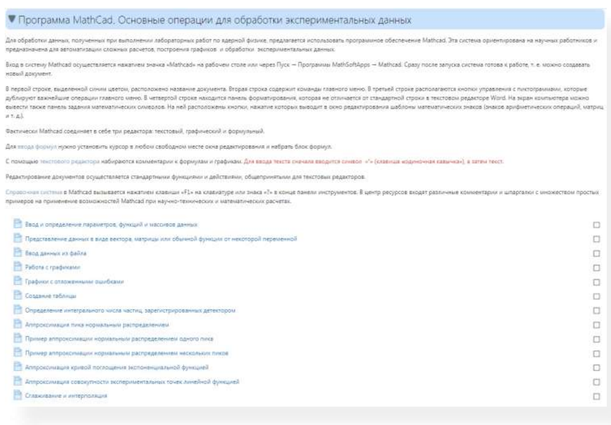


◦ Ionizing radiation sources



◦ Software “MathCad”

The spectra obtained are saved in a file of the type “DAT” that allows to process the received experimental data with the help of any data processing software



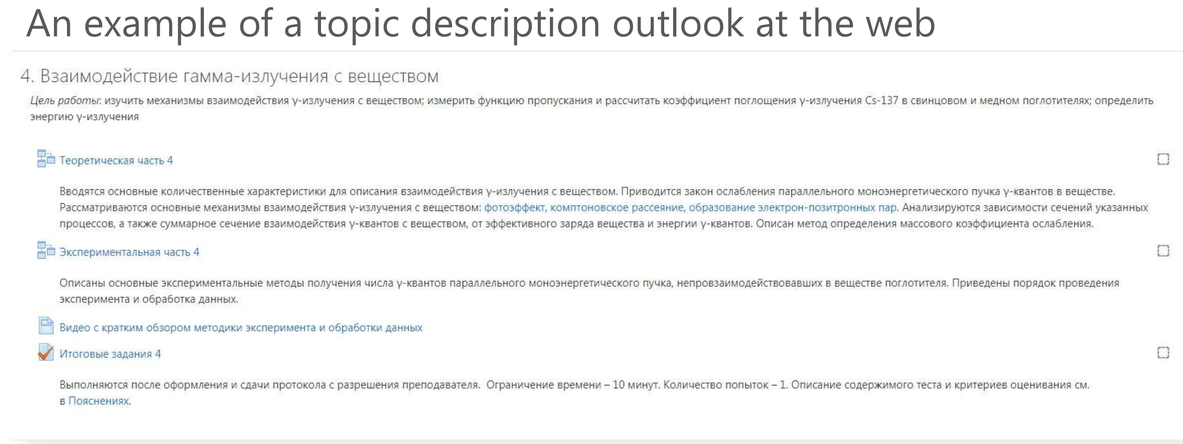
Laboratory works

The training module consists of manuals for 10 laboratory works to the Part I “Review of Fundamentals” and Part II “Quantities and measurements” of the PGEC Syllabus. The manuals are formed along the equal principles anticipating the formulation of the work purpose, briefing in objects and phenomena to be studied, experimental part with the description of a set-up and methodology of measurements to be used, and also list of assignments on performing an experiment and data processing.

The laboratory work topics comprise the following: radioactivity, interaction of ionizing radiation with matter, detection and measurement of nuclear radiation, dosimetry, etc. The main concept definitions are provided in the Glossary attached.

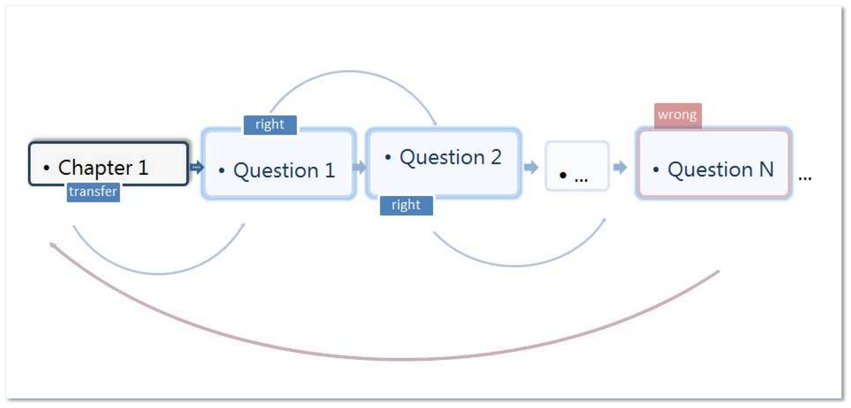
After learning theoretical material a student/participant is proposed to implement a number of assignments. There are more than 300 questions for a quiz. Their role is to facilitate a student/participant self-study: to assume a theory, to make self-control of the main concepts and physical laws acquiring. There are also control questions to check the compliance of a student/participant with appropriate learning objectives that he/she has an opportunity to demonstrate in personal communication with an instructor while defending a laboratory work report.

An example of a topic description outlook at the web

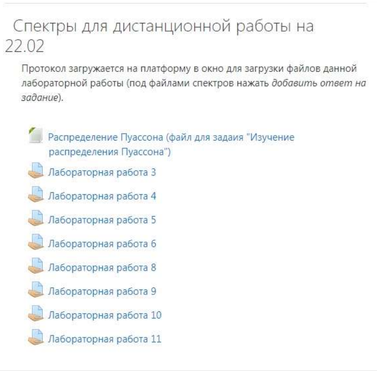


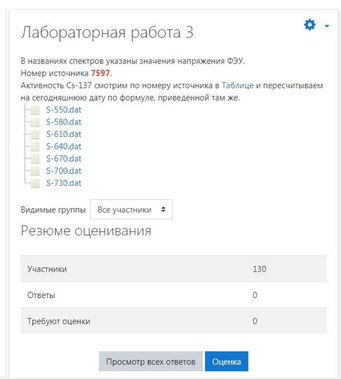
Implementation performance indicator of a Theoretical part “Lecture”

The chart of a student/participant progress flow for self-control

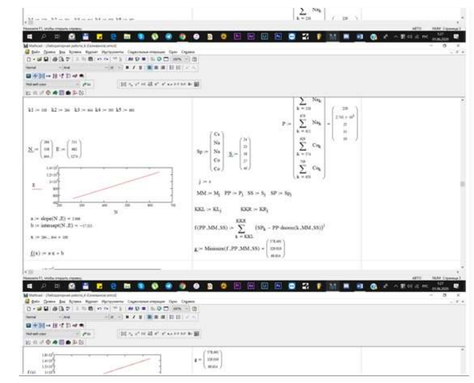


Spectra for the e-learning

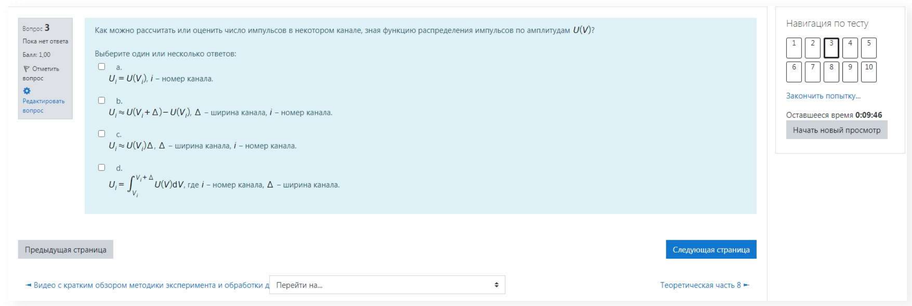




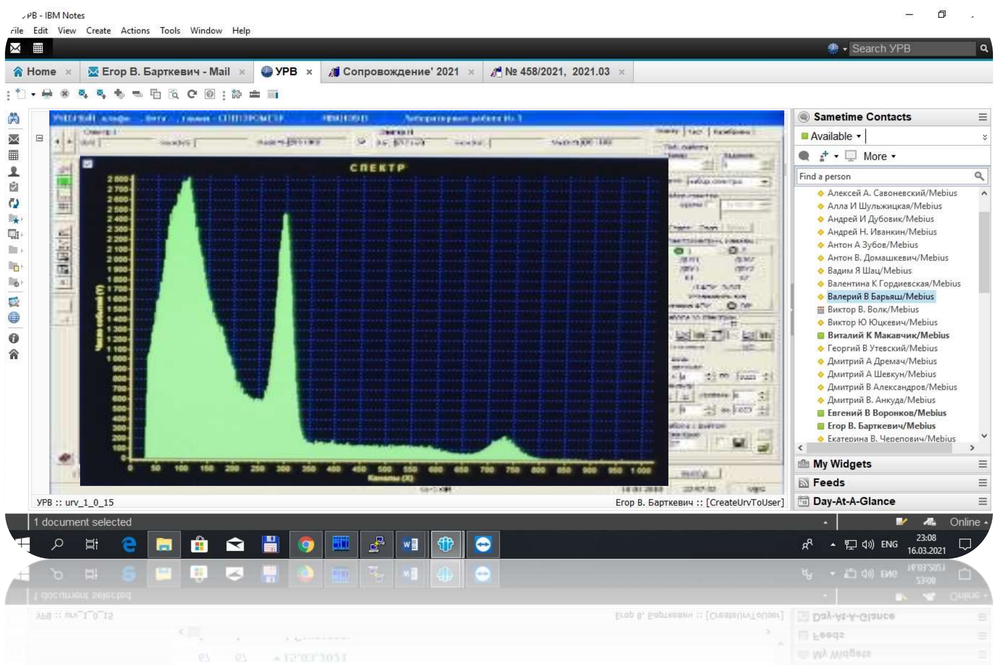
The exerpt from file with the data processing



One of the questions from the final quiz



Remote set-up control “Remote desktop”



Control of a student/participant performance