

Guidelines for the Preparation of a Laboratory Report

1. General Requirements

- The report should be prepared either in printed form or in a legible handwritten form.
- Pages must be numbered. The cover page of the report should contain: the title of the experiment, the student's full name, group, and date of completion.
- All figures, tables, and graphs shall include captions and consecutive numbering; they must be properly referenced in the text.
- Final expressions must include substitution of numerical values and the resulting value with its associated uncertainty.

2. Structure of the Report

The report should include the following sections:

- **Aim of the experiment** — a concise statement of what is being verified or investigated.
- **Theoretical background** — principal formulas and models employed.
- **Description of the apparatus and experimental procedure** — schematic diagram of the setup (a simplified sketch is acceptable) and the sequence of measurements.
- **Experimental results:**
 - tables of experimental measurements;
 - frequency histograms of events with superimposed theoretical calculations;

- plots of empirical distributions;
 - outcome of hypothesis testing regarding the presence of a radioactive source.
- **Data analysis:**
 - determination of the mean number of counts and the counting rate for each task;
 - comparison of standard errors obtained by two independent methods;
 - evaluation of the counting rate of events attributed to the source and estimation of the probability of detecting its decays (if a source was used), or refinement of the background counting rate otherwise.
 - **Conclusions:**
 - interpretation of the obtained results;
 - comparison of the experimental findings with theoretical expectations;
 - key conclusions concerning the objectives and outcomes of the work performed.

3. Control Questions

The report should contain answers to the following control questions:

- 1) Do the Poisson and Gaussian distributions adequately describe the histograms obtained? How can the observed similarities or discrepancies be explained?
- 2) What are background events, and which particles predominantly contribute to the radioactive background?
- 3) Estimate the minimum particle energy detectable by a Geiger counter.

- 4) Which factors may affect the accuracy of pulse registration by the detector?

The report is to be submitted via the messenger in the Nuclear Practicum system **no later than 1 week after performing the task.**