

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:**
 - plots of the decay curve in each measurement with superimposed fitted exponential curves;

- plot of the recreated activation curve and its fitting formula with values of all the parameters obtained in the fitting procedure.
- **Data analysis:**
 - determination of the half-life of the sample in each of the measurements obtained from the fitting procedure for the decay curves;
 - evaluation of the mean half-life and its standard error;
 - determination of the half-life of the sample obtained from the fitting procedure for the activation curve.
- **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) Which particles were registered by the Geiger counter in this experiment?
- 2) Does the exponential time-dependence of the particle counting rate originating from the radioactive decay law adequately describe the decay and activation curves obtained? How can the observed similarities or discrepancies be explained?
- 3) Which factors may affect the accuracy of particle registration by the detector? Which human factors could affect the accuracy of the obtained results?

- 4) Why is it important to include an intercept (an independent constant term) in the fitting procedure for the decay curve? What is its physical interpretation?

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