# Assignment 1 Geomodelling WS 2024/2025

## (to be handed in on November 30th 2024 via opal)

Please hand in a pdf - file (no excel or code scripting) with numbered answers referring to the solutions

**Task 1:**

An ideal die is thrown twice. The random variable X shall be the sum of the results multiplied by 1,5.

A) Document the probability function of X
B) Document the conditional probability function P(X=k|D), where the condition D describes that the first throw resulted in a 4.

**Task 3:**

Please solve following expression:

$$VAR(X_1 + X_2 + X_3)$$

**Task 2:**

Show that:

$$\gamma(h) = COV(0) - COV(h)$$

Note, for task 2 and 3 the definitions of expectation, variance and covariance should be used.

**Task 4:** A data set is provided (Excel sheet) with a data series 1 (element 1) and a data series 2 (element 2) sampled in 1 m intervals. Please calculate:

- Mean, Median, Variance, Standard Deviation, IQR, Min and Max of both series as well as the covariance and the coefficient of correlation.
- A Variogramm for each data series
- A Cross Variogramm between data series 1 and 2
- Based on the Cross-Variogramm, suggest a possible offset of series 2 from 1

To solve this task, you may use the software Excel, python or R.