



Elective Module (any master programme in biology)

Winter Term 2023/24

## Data analysis in the life sciences

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Modern biology research increasingly requires the ability to analyze large data sets. The main goal of this module is to gain basic programming skills in Python and hands-on experience with the quantitative analysis of experimental data, the numerical solution of simple mathematical models, and the presentation of the results. No previous programming skills are required.

After a detailed introduction into basic programming with Python, students will work in small teams on specific exercises and small projects. These projects will use recent experimental data covering topics from different areas of biology. Specific examples include large data sets from systems biology (e.g. chemical genomics) and flow cytometry. In addition, the numerical solution of simple mathematical models of biological phenomena and statistical techniques such as null models and bootstrapping will be covered. Finally, the course participants will learn how to visualize their results in publication-quality figures.

After the practical course, each student has to take an oral exam about their analysis methods and results for one project.

*Credit Points: 6*

*Dates and times:* 07.03. – 22.03.2024; every weekday 9:00 – 16:30. The last two days are reserved for the exam, consisting of project work on the first day and an oral exam on the second day. If you have no or little previous programming experience, we strongly recommend that you do not miss the first four days.

*Location:* Course Room I or II of the Biocentre (Building 304)

*Registration:* At most 24 students can participate (first come, first serve). To register, please contact gansmann@uni-koeln.de, stating in which programme you are enrolled and your ILIAS username.

*Equipment:* You usually best bring own laptop (or similar). If you cannot, mention this as early as possible and we will find a solution.