

# QBio104: Programming

**Module Responsible:**  
Prof. Dr. Martin Lercher

**Version:**  
02/01/2021

**Module Organizer:**  
Prof. Dr. Martin Lercher

**Type:**  
Compulsory

**Lecturer:**  
Dr. Hajira Jabeen

Total Working Time	Credit Points	Contact Time	Self Study	Duration
180 h	6 CP	75 h	105 h	1 Semester

Course Components	Group Size	Frequency
Lecture: 3 SWS Exercise: 2 SWS	P: 40 P: 20	Every Winter Semester

## Learning Competencies:

After passing this course students should be able to

- Explain and apply the basic principles of computer programming.
- Apply the different dynamic data structures covered in the course.
- Design simple algorithms and implement them in the programming language Python
- Develop different algorithmic solutions to the same problem and evaluate their efficiency
- Perform basic data analyses and visualize the results

## Content:

This module provides basic programming knowledge in the object-oriented programming language Python. In addition, introductory aspects of algorithms and data structures are discussed.

- Introduction to Programming and the Linux command line
- Introduction to Python and Notebooks; primitive data types and variables
- Control structures
- Dynamic data structures: String, Lists, Tuples
- Advanced data structures: Dictionaries, Sets, Data Frames
- Functions and Packages
- Data streams and file handling; regular expressions
- Hashing
- Introduction to numeric calculations with Numpy
- Design and efficiency of computer algorithms
- Introduction to scientific graphics with Matplotlib
- User-defined data structures: Classes

**Conditions of Participation:**

Enrolled in Quantitative Biology

**Examination:**

Project Work

**Prerequisites for Awarding Credits for this Module:**

Passing Project Work

**Factor for the Overall Grade:**

The grade is weighted according to the credit points (CP) in the overall grade.

**Language:**

English

**Literature:**

Think Python - How to Think Like a Computer Scientist, 2nd Edition, Version 2.2.23  
Data Structures and Algorithms in Python

**Further Information: -**