

QBio203: Principles of Statistics & Stochastic

Module Responsible: Prof. Dr. Benjamin Stich			Version: 02/01/2021	
Module Organizer: Prof. Dr. Benjamin Stich			Type: Compulsory	
Lecturer: Prof. Dr. Benjamin Stich, Dr. Ovidiu Popa				
Total Working Time 180 h	Credit Points 6 CP	Contact Time 75 h	Self Study 105 h	Duration 1 Semester
Course Components Lecture: 2 SWS Exercise: 3 SWS		Group Size P: 40 P: 40	Frequency Every Summer Semester	
Learning Competencies: The significance of experimental studies depends decisively on the choice of a suitable experimental design and the corresponding statistical modelling. After successful completion of the module, the participants know the basic principles of experimental design and can plan simple experiments according to statistical aspects. The participants have basic knowledge of probability in the context of statistical analyses. They have the ability to formulate hypotheses from questions of interest. They know different data types as well as the basic statistical tests that are applied to them. The participants recognize when to apply a parametric or a non-parametric test. They will have a basic knowledge how to use the statistical software R for statistical analyses.				
Content: Lecture: <ul style="list-style-type: none"> • Introduction in R • Data types • Descriptive statistics • Probability distribution <ul style="list-style-type: none"> ○ Discrete ○ Continuous ○ Sample Space ○ Normal distribution ○ Binomial distribution ○ Univariate vs multivariate • Probability Single and Multiple Events • Likelihood Function <ul style="list-style-type: none"> ○ Discrete vs Continuous ○ Maximum likelihood • Null hypothesis 				

- Type I and II error
- Statistical tests for different combinations of dependent and independent variables
 - nomial
 - ordinal
 - metric data
- Principles of experimental design
- Stochastic processes-
 - master equation
 - markov chains

Exercises:

The theoretical basics are taught in the lecture before the exercises. In the exercises the contents are deepened by analysing example data sets mainly from plant sciences with the software R.

Conditions of Participation:

Passed Module QBio103

Examination:

Learning portfolio consisting of

- Written exams based on the content of the lectures (50% of the final grade)
- Exercises (50% of the final grade)

Prerequisites for Awarding Credits for this Module:

- Passing Exercises (50 % of Exercise Sheets)
- Passing Written Exam

Factor for the Overall Grade:

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

Language:

English

Literature:

Further Information: