

1	Module name	Theory and practice of statistical data analysis	5 ECTS-Punkte
2	Courses/Lectures	10 Lectures and 11 Tutorials (3 SWS)	
3	Lecturers	Prof. V. Zaburdaev	

4	Module co-ordinator	Prof. Vasily Zaburdaev
5	Contents	<p>Goal of this course is to provide basics of theoretical and practical skills to analyze and report data. Ideally, at the end of this course you would know what actually the statistical tests tell you and what are the limits of their application, why is that that you have to “do at least 3 measurements, but better at least 6”, and what the box plot shows. The main topics are:</p> <ul style="list-style-type: none"> • Mean, SD, SEM and presentation of data • Student’s t-test and assumptions behind it • Chi-squared and linear regression • Statistical inference on experimental data • Probability, random variables (RV) and expectation • Examples of RVs; probability distributions • Non-parametric tests • Bayesian approaches
6	Learning targets and skills	<p>The students are able to</p> <ul style="list-style-type: none"> • understand where variability in measurements comes from • identify sources of errors and quantify them • relate the measurement outcomes to notions of probability theory • do the propagation of errors • clearly understand the meaning and applicability of statistical tests • graphically present data and report errors • formulate what theoretical concepts are hiding behind standard data evaluation tools
7	Recommended prerequisites	Basic mathematics course in Biology studies.
8	Integration in curriculum	
9	Module compatibility	BA and MA Biology, MA Integrated Immunology, ILS
10	Method of examination	Written report and a presentation with original data analysis (individual or in groups)
11	Grading procedure	50% report and 50% presentation
12	Module frequency	Yearly in SS
13	Workload	Contact hours: 42 h Independent study: 108 h
14	Module duration	1 Semester
15	Teaching language	English
16	Recommended reading	<p>Young HD. 1962. <i>Statistical treatment of experimental data</i>. New York: McGraw-Hill</p> <p>Rice JA. 1995. <i>Mathematical Statistics and Data Analysis</i>. 2nd Edition. Duxbury Press, Belmont, California.</p> <p>Feller W. 1968. <i>An introduction to probability theory and its applications</i>, Volume 1 and 2, Wiley.</p>