

## Module Handbook

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# Course BIO-BTE-03-K-5

Fundamental Concepts and Applications in Systems Biology (S, 3.0 LP)

## Course Type

SWS	Type	Course Form	CP (Effort)	Presence-Time / Self-Study
-	S	Reading course	3.0 CP	24 h 66 h
(S)			3.0 CP	24 h 66 h

## Basedata

SWS	S
CP, Effort	3.0 CP = 90 h
Position of the semester	1 Sem. in WiSe
Level	[5] Master (Entry Level)
Language	[EN] English
Lecturers	Mühlhaus, Timo, Jun. Prof. Dr. (PROF   DEPT: BIO) Schroda, Michael, Prof. Dr. (PROF   DEPT: BIO) Sommer, Frederik, Dr. (WMA   DEPT: BIO)
Area of study	[BIO-BTE] Molecular Biotechnology and Systems Biology
Lifecycle-State	[NORM] Active

## Possible Study achievement

- Verification of study performance: **continuous and active participation in the courses**
- Details of the examination (type, duration, criteria) will be announced at the beginning of the course.

Contents

Content:

The students will hear introductory lectures, read research and review papers, and discuss together and with the teacher the following topics:

- Quantitative biology and Systems Biology
- Basic concepts in bioinformatics including biostatistics, machine learning and network analysis
- Application of quantitative methods in Plant Systems Biology research

## Competencies / intended learning achievements

### Professional competence:

- Knowledge on statistical testing and machine learning used in quantitative biology
- Understanding the concept of connectivity in biological systems and methods for its analysis
- Understanding the principles and pitfalls of quantitative methods applied to biological questions
- Application of deep sequencing technologies and quantitative proteomics strategies to answer specific questions in Plant Systems Biology research

### Methodological competence: ---

### Social competence:

- Learning to discuss scientific issues with other students and the teacher and explaining complex concepts
- Learning to simplify complicated topics and ideas and to identify their key aspects

### Self-competence:

- Acquisition of scientific knowledge by self-responsible reading of English research literature and identification of aspects that require further explanation
- Critical evaluation of current research data

Intended Learning Outcomes:

On successfully completing the module students will be able to...

- understand the foundation of Systems biology with a special focus on the application of quantitative and computational methods in biology
- read and understand English literature on Systems Biology approaches
- read and discuss research papers orally

## Literature

Will be provided at or prior to the beginning of the course

## Materials

PDFs of lecture and literature for seminar will be provided on the homepage of the department Molecular Biotechnology & Systems Biology

## Requirements for attendance (informal)

Bachelor-grade knowledge in Molecular Biotechnology, Genetics, Biochemistry, and Cell Biology

## Requirements for attendance (formal)

Admission to the Master Program 'Biology'

## References to Course [BIO-BTE-03-K-5]

Course-Pool	Name
[BIO-LR_all-KPOOL-5]	Lecture & Reading Course - all
[BIO-LR_MCB-KPOOL-5]	Lecture & Reading Course: MCB
[BIO-LR_MPBiotech-KPOOL-5]	Lecture & Reading Course: MPBiotech