



Computational Biology

Module title:

Computational Biology

Credits:

6

Responsible person:

Brock, Oliver

Office:

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Contact person:

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Website:
<http://www.robotics.tu-berlin.de/menue/teaching/>
Display language:

Englisch

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Learning Outcomes

The module conveys the necessary background knowledge in molecular and cell biology for students to conduct research in the area of computational structural biology. Special emphasis is given to topics in the intersection of computer science and molecular biology. The course introduces relevant algorithms and concepts from computational biology, computer science, robotics, optimization, etc.

Content

Search and optimization, molecular biology, DNA, RNA, protein structure prediction, dynamic programming, cellular biology, statistics, probabilistic models, bioinformatics, genomics, proteomics, protein folding, protein motion, protein docking, protein design, robotics motion planning.

Module Components

Course Name	Type	Number	Cycle	SWS
Computational Biology	VL	0433 L 410	WS	2
Computational Biology	UE	0433 L 411	WS	2

Workload and Credit Points

Computational Biology (Vorlesung)	Multiplier	Hours	Total
Preparation and review	15.0	2.0h	30.0h
Presence in lectures	15.0	2.0h	30.0h
			60.0h
Computational Biology (Übung)	Multiplier	Hours	Total
Assignments	15.0	4.0h	60.0h
Presence in exercises	15.0	2.0h	30.0h
			90.0h
Course-independent workload	Multiplier	Hours	Total
Exam preparation	1.0	30.0h	30.0h
			30.0h

The Workload of the module sums up to 180.0 Hours. Therefore the module contains 6 Credits.

Description of Teaching and Learning Methods

The course consists of lectures and applied programming exercises.

Requirements for participation and examination

Desirable prerequisites for participation in the courses:

No prior knowledge of biology is needed.

Python or C++ knowledge is required!

Bachelor degree in relevant field of study; Bachelor students in 7th semester of "Technische Informatik" can register after consultation with the professor.

Mandatory requirements for the module test application:

No information

Module completion

Grading:

graded

Type of exam:
Portfolio examination
100 points in total
Language:

English

Grading scale:

Note:	1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.0
Punkte:	95.0	90.0	85.0	80.0	75.0	70.0	65.0	60.0	55.0	50.0

Test description:

No information

Test elements	Categorie	Points	Duration/Extent
(Deliverable assessment) 5 Assignments	practical	50	1-5 pages of text and code per assignment
(Examination) Written Exam	written	50	75

Duration of the Module

This module can be completed in one semester.

Maximum Number of Participants

The maximum capacity of students is 40

Registration Procedures

See <http://www.robotics.tu-berlin.de/menue/teaching/>

Registration for the exam in compliance with the regulations; further information is provided in the lecture.

Recommended reading, Lecture notes**Lecture notes:**

unavailable

Electronical lecture notes :

unavailable

Recommended literature:

Amit Kessel, Nir Ben-Tal. Introduction to Proteins: Structure, Function, and Motion, 2011.
 Market Zvelebil, Jeremy O. Baum. Understanding Bioinformatics. Taylor & Francis Ltd., 2008.
 Tamar Schlick. Molecular Modeling and Simulation: An Interdisciplinary Guide Springer, 2010.

Assigned Degree Programs

This module is used in the following modulelists:

Computer Engineering (Master of Science)

StuPO 2015

Modullisten der Semester: WS 2017/18 SS 2018 WS 2018/19

Computer Science (Informatik) (Master of Science)

StuPO 2015

Modullisten der Semester: WS 2017/18 SS 2018 WS 2018/19

Elektrotechnik (Master of Science)

StuPO 2015

Modullisten der Semester: WS 2017/18 SS 2018 WS 2018/19

Informatik (Master of Science)

MSc Informatik PO 2013

Modullisten der Semester: WS 2017/18 SS 2018 WS 2018/19

Technische Informatik (Master of Science)

StuPO 2013

Modullisten der Semester: WS 2017/18 SS 2018 WS 2018/19

Wirtschaftsinformatik / Information Systems Management (Master of Science)

StuPO 2013

Modullisten der Semester: WS 2017/18 SS 2018 WS 2018/19

Wirtschaftsingenieurwesen (Master of Science)

StuPO 2015

Modullisten der Semester: WS 2017/18 SS 2018 WS 2018/19

Master students in Computer Science StO/PO 2010/ Focus Intelligent Systems
 Master students in Computer Science StO/PO 2016 / Focus Cognitive Systems
 Master students in Computer Engineering / Focus Information Systems
 Master students in Computer Engineering StO/PO 2014:
 Focus Cognitive Systems and Robotics, Computer Science
 Focus Information Systems, Computer Science

Miscellaneous

No information