

PHY-M-VE 07

Effective WS 2011/2012 / Please also see remarks in item 13.

1. Module title:	Bioinformatics as Complementary Subject
2. Field / responsibility of:	Faculty of Medicine, Prof. Dr. Rainer Spang
3. Module contents:	<p>PHY-M-VE 7.1 Genome Science and Bioinformatics I:</p> <p>Introductory topics of biology as well as biostatistics and bioinformatics will be discussed on an alternating basis. From a biological perspective, a survey will be given on the various levels of biological interaction and regulation from the gene to the organism with a focus on understanding genome data like sequence and molecular structure data. We will also identify problems interpreting this data. This is where bioinformatics and biostatistics come in. The underlying theories will be developed by means of genome data. In the first semester, discrete models from statistics and algorithmics will play a central role.</p> <p>PHY-M-VE 7.2 Genome Science and Bioinformatics II:</p> <p>Topics of biomedicine and bioinformatics will be covered on an alternating basis. We will focus on pathological and physiological disorders of organ function as well as the corresponding disruption of signaling pathways and their genetic causes. The biomedical canon will be supplemented by processes of medical bioinformatics and biostatistics with an emphasis on continuous statistical methods.</p>
4. Qualification objectives of the module / competencies to be acquired:	<p>Students are to become familiar with the basic principles of cell biology and genome science and at the same time understand the role computers play in modern genome research.</p> <p>In the accompanying practical course in the CIP pool, students are given the opportunity to practice analyzing genome data.</p>
5. Prerequisites for participation:	
a) Recommended knowledge:	None
b) Prerequisite courses:	None
6. Module can be used for:	Master in Physics
7. Module is offered:	SS, on a yearly basis
8. Module can be completed in:	2 semesters
9. Recommended semester of study:	2
10. Overall module workload / number of credit points:	<p>Workload:</p> <p>Total number of hours: 480</p> <p>Allocation:</p>

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	1. Attendance: 16 credit hours 2. Independent study (including exam preparation/ exam): 240 hours Credit points: 16
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The successful completion of all assignments listed in items 11 and 12 is a prerequisite for receiving the credit points mentioned in item 10.

11. Module components:

No.	Req./req. elective	Form of teaching	Subject area/topic	Credit hours	Coursework
PHY-M-VE 07.1a	Compulsory	Lecture	Genome Science and Bioinformatics I	4	Written exam (90 min.) at the end of the lecture period
PHY-M-VE 07	Compulsory	Practical course	Genome Science and Bioinformatics I	4	
PHY-M-VE 07.2a	Compulsory	Lecture	Genome Science and Bioinformatics II	4	Written exam (90 min.) at the end of the lecture period
PHY-M-VE 07.2b	Compulsory	Practical course	Genome Science and Bioinformatics II	4	

12. Module exam:

No.	Competence / topic	Type of exam	Duration	Time / notes	Weighting of module grade
PHY-M-VE 7.1	Genome Science and Bioinformatics I and II	Oral	30 minutes	After successfully completing the module components	1

13. Notes:

Prior to starting Bioinformatics II, Bioinformatics I has to be completed successfully. The practical course is separated into two credit hours of exercises (based on the lectures) and two credit hours with general instructions to program in the field of bioinformatics. Students for whom the module components PHY-B-WE 10.1a to 10.2b already counted towards their bachelor degree can complete either the module CS-B-Gen4 "Practical Bioinformatics I" (12 CPs) or the module CS-B-Gen5 "Practical Bioinformatics II" (10 CPs) of the Computational Science bachelor program as well as an additional course from the field of bioinformatics of the Computational Science master program in the scope of at least 4 CPs or 6 CPs. In this case, the grade is the mean value of all graded records of achievement, weighted by credit points.