

PHY-M-VE 01

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

1. Module title:	Scientific Informatics as Complementary Subject
2. Field / responsibility of:	Physics / faculty, Dean of Studies; Chemistry / faculty, Prof. Dominik Horinek
3. Module contents:	<p>Selected topics of applied informatics with relevance to the fields of chemistry and physics. Courses are offered by the Faculties of Mathematics, Physics, Biology, Chemistry and Medicine, and by the Computer Center. Examples are:</p> <ul style="list-style-type: none">• Statistical methods• Numerical processes; optimization• Non-numerical algorithms and data structures• Monte Carlo methods to simulate physical and chemical systems• Molecular modeling• Molecular dynamics simulations• Bioinformatics• Genomic data analysis• Machine learning• Technical IT: control, measurement data gathering, digital signal processing• Dynamic, database-supported web techniques• Computer and micro-controller technology• Computer architectures• Programming of parallel computers• Object-oriented programming techniques <p>Basic IT courses such as an introduction to a programming language or to an application system cannot be attended as part of this module; rather, the knowledge acquired there is a recommended prerequisite for scientific informatics.</p>
4. Qualification objectives of the module to be acquired:	Through examples, students will learn methods of applied informatics, which are of great importance in their field of chemistry or physics. They will be equipped with the knowledge needed to address with competence all informatics related questions they may encounter in their professional life.
5. Prerequisites for participation:	
a) Recommended knowledge:	Command of a programming language; working knowledge of software for symbolic mathematics
b) Prerequisite courses:	None
6. Module can be used for:	MSc. in Chemistry, MSc. in Physics
7. Module is offered:	On a semiannual basis

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8. Module can be completed in:		1 semester			
9. Recommended semester of study:		1			
10. Overall module workload / number of credit points		Workload: Total number of hours: 480 Allocation: 1. Attendance: 12 credit hours 2. Independent study (including exam preparation / exam): 300 hours Credit points: 16			
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 0 1.1	Compulsory	Lecture Practical course	Scientific informatics	12	Practical exercises, projects
12. Module exam:					
No.	Competence / topic	Type of exam	Duration	Time / notes	Weighting of module grade
PHY-M-VE 0 1.1	Scientific informatics	Oral	40 minutes		1
13. Notes:					
<p>For the exam, students select topics in the scope of 8 credit hours from the 12 credit hours attended. These will be tested in an oral exam held by two appointed examiners. The two examiners may not come from the same institute. The chemistry or physics master's examination board nominates the potential examiners. Usually, all instructors offering courses in the context of scientific informatics are entitled to serve as examiners. The exam can be taken at any time after having attended the respective courses to the extent required.</p>					