PHY-M-VF 3

Effective WS 2011/12

1. Module title:	**Laser Physics**
2. Field / responsibility of:	Physics / the faculty, the Dean of Studies
3. Module contents:	• Introduction and overview • Physical principles, Einstein coefficients • Electromagnetic radiation, coherence • Spectral lines (homogeneous and inhomogeneous line broadening) • Laser principles • Laser resonators • ABCD matrices • Mode selection and mode locking • Gas lasers • Solid-state lasers • Semiconductor lasers • Color center lasers • Chemical lasers • Free-electron lasers • Applications • New concepts
4. Qualification objectives of the module / competencies to be acquired:	Acquiring a fundamental knowledge of the key concepts and most important methods used in laser physics. Experimental techniques as well as theoretical principles will be discussed.
5. Prerequisites for participation:	
a) Recommended knowledge:	Solid-state physics, semiconductor physics, quantum mechanics I
b) Prerequisite courses:	None
6. Module can be used for:	MSc. in Physics, MSc. in Nanoscience, MSc. in Comp. Science; BSc. in Nanoscience, BSc. in Comp. Science
7. Module is offered:	On a yearly basis
8. Module can be completed in:	1 semester
9. Recommended semester of study:	Minimum: 1
10. Overall module workload / number of credit points:	**Workload:** **Total number of hours: 240** **Allocation:** **1. Attendance: 4 credit hours** **2. Independent study (including exam preparation / exam): 180 hours** **Credit points: 8**
11. The module is successfully completed when the requirements below have been met.	

12. Module components:

Nr.	Req./req. elective	Form of teaching	Subject area / topic	Credit hours	Coursework
PHY-M -VF 3	Required elective	Lecture	Laser physics	4	

13. Module exam:

Nr.	Competence / topic	Type of exam	Duration	Time / notes	Weighting for module grade
PHY-M -VF 3 .1	Laser physics			Type of exam: Oral or written; duration: 20 min, or 105 min, 135 min or 210 min (if it consists of two parts); time: Lecture period to end of semester	1

14. Notes:

Further information will be provided by the instructors at the beginning of the course.