

READING VERSION OF MODULE DESCRIPTIONS

The module descriptions are not part of the Regulations; they are integrated into the First Amendment to the Module Catalog.

PHY-750: Astrophysics I		Number of credit points (CP): 12		
Module type (mandatory or elective)	Depends on course of study			
Content and objective of module:	<p>Contents:</p> <p>The lecture “Stars and Stellar Evolution” deepens students’ knowledge of the core areas of stellar astrophysics, specifically stellar atmospheres, stars’ composition and evolution, and star populations.</p> <p>The lecture “Galaxies and Cosmology” deepens students’ knowledge of (extra)galactic astrophysics, specifically the composition and evolution of galaxies, the formation of cosmic structures, cosmology, and the early universe.</p> <p>Objectives:</p> <p>1. Subject competencies</p> <ul style="list-style-type: none"> • The students possess a deeper understanding of the composition and evolution of stars, galaxies, and the cosmos as a whole. • The students are able to reflect upon the relationships between the subfields. • The students are able to draw scientifically founded conclusions related to the subfield. <p>2. Methodological competencies</p> <ul style="list-style-type: none"> • The students can pose questions of their own on topics in stellar and extragalactic astrophysics and examine them using appropriate methods. • The students are capable of applying appropriate methods and procedures to solving complex tasks in stellar and extragalactic astrophysics. <p>3. Performance competencies</p> <ul style="list-style-type: none"> • The students are capable of discussing complex issues with their fellow students during the tutorials. • The students develop strategies for solving the tutorial assignments and can present these comprehensibly. 			
Module (partial) exam(s) (number,	Written exam, 120 min			
Independent study time (in hours):	240			
Courses (type of teaching)	Contact time (in semester hours)	Supplementary exam work (Number, form, scope)		Module (partial) exam(s) (Number, form,
		For completing the module	For admission to the module exam	
Galaxies and Cosmology (seminar)	1	-	-	-
Stars and Stellar Evolution (seminar)	1	-	-	-

Galaxies and Cosmology (seminar and tutorial)	2/1	-	Successful completion of exercises	-
Stars and Stellar Evolution (seminar and tutorial)	2/1	-	Successful completion of exercises	-
Offered:	Lecture/tutorial: Stars and Stellar Evolution: every winter semester Lecture/tutorial: Galaxies and Cosmology: every summer semester			
Prerequisite for taking the module:	None			
Teaching unit:	Physics			

PHY-751: Astrophysics II		Number of credit points (CP): (CP): 6		
Module type (mandatory or elective)	Depends on course of study			
Content and objective of module:	<p>Contents:</p> <p>The Astrophysics Lab Course includes quantitative astrophysical measurements made through telescopes as well as their scientific evaluation.</p> <p>The Astrophysical Seminar covers current topics in astrophysical research.</p> <p>Objectives:</p> <ol style="list-style-type: none"> 1. Subject competencies <ul style="list-style-type: none"> • The students possess a deeper understanding of astronomical observation methods. • The students are able to reflect upon the relationships between astronomical observation methods and scientific questions in astrophysics. 2. Methodological competencies <ul style="list-style-type: none"> • The students are capable of planning, executing, and evaluating astronomical observations. • The students can assess, discuss, and present original publications in astrophysics. • The students can pose questions of their own on topics in astrophysics and examine them using appropriate methods. 3. Performance competencies <ul style="list-style-type: none"> • The students can discuss their work and express it in writing. • The students can present and defend original publications in front of the other seminar members using appropriate presentation media. • The students are capable of working in teams and pursuing a question jointly. 			
Module (partial) exam(s) (number,	Seminar presentation, 30 min			
Independent study time (in hours):	105			
Courses (type of teaching)	Contact time (in semester hours)	Supplementary exam work (Number, form, scope)		Module (partial) exam(s) (Number, form,
		For completing the module	For admission to the module exam	
Seminar (seminar)	2	-	-	-
Lab (lab)	3	Preparing observation logs	-	-
Offered:	LC: Lab course in astrophysics: every semester S: Seminar in astrophysics: every semester			
Prerequisite for taking the module:	None			
Teaching unit:	Physics			

PHY-735: Advanced Physics		Number of credit points (CP): 12		
Module type (mandatory or elective)	Depends on course of study			
Content and objective of module:	<p>Contents:</p> <p>Students select two lectures + tutorials and one seminar + tutorials in the field of advanced physics. Examples include lectures/seminars in the topic areas of general relativity, particle physics, plasma physics, and quantum physics.</p> <p>Objectives:</p> <p>1. Subject competencies</p> <ul style="list-style-type: none"> • The students possess a deeper understanding of important subfields of modern physics. • The students are able to reflect upon the relationships between the subfields of advanced physics and astrophysics. <p>2. Methodological competencies</p> <ul style="list-style-type: none"> • The students can pose questions of their own on topics in advanced physics and examine them using appropriate methods. • The students are capable of applying mathematical methods and procedures to solving complex tasks in advanced physics. <p>3. Performance competencies</p> <ul style="list-style-type: none"> • The students are capable of discussing complex issues in physics with their fellow students during the tutorials. • The students develop strategies for solving the tutorial assignments and can present these comprehensibly. 			
Module (partial) exam(s) (number,	Oral exam (45 min)			
Independent study time (in hours):	225			
Courses (type of teaching)	Contact time (in semester hours)	Supplementary exam work (Number, form, scope)		Module (partial) exam(s) (Number, form,
		For completing the module	For admission to the module exam	
Lecture and associated tutorial (lecture and tutorial)	2/1	-	Successful completion of exercises	-
Seminar and associated tutorial (seminar)	2/1	-	Successful completion of exercises	-
Lecture and associated tutorial (lecture and tutorial)	2/1	-	Successful completion of exercises	-
Offered:	Every semester			
Prerequisite for taking the module:	None			
Teaching unit:	Physics			

PHY-755: Methods of Modern Astrophysics		Number of credit points (CP): 12		
Module type (mandatory or elective)	Depends on course of study			
Content and objective of module:	<p>Contents:</p> <p>The “Scientific Writing in Astrophysics” seminar imparts skills and strategies for composing scientific texts in the field of astrophysics. In addition, students select three lectures related to the methods of modern astrophysics. Examples include lectures on the topics of astronomical instruments, spectroscopy, computational astrophysics, statistical methods in astrophysics, astronomical distance determination, and radioastronomy.</p> <p>Objectives:</p> <p>1. Subject competencies</p> <ul style="list-style-type: none"> • The students possess a deeper understanding of modern astrophysical research methods. • The students are able to reflect upon the relationships between scientific questions in astrophysics and methodological approaches to answering them. <p>2. Methodological competencies</p> <ul style="list-style-type: none"> • The students can classify existing methods in astrophysical research and apply them to a concrete problem. • The students are capable of identifying and characterizing mathematical, physical, and conceptual aspects of the methodology of astrophysical research. <p>3. Performance competencies</p> <ul style="list-style-type: none"> • The students are capable of discussing complex methodological issues with their fellow students. • The students develop solution strategies for improving astrophysical methods and can present these comprehensibly. 			
Module (partial) exam(s) (number, form, scope):	Portfolio exam consisting of a term paper (20 pages) and a report independently expressing the competencies acquired during the module and summarizing the key aspects in a scientifically appropriate manner.			
Independent study time (in hours):	240			
Courses (type of teaching)	Contact time (in semester hours)	Supplementary exam work (Number, form, scope)		Module (partial) exam(s) (Number, form,
		For completing the module	For admission to the module exam	
Lecture (lecture)	2	-	-	-
Lecture (lecture)	2	-	-	-
Lecture (lecture)	2	-	-	-
Scientific Writing in Astrophysics Seminar	2	-	-	-
Offered:	L: every semester; S: Scientific Writing in Astrophysics: every summer semester			
Prerequisite for taking the module:	None			
Teaching unit:	Physics			

PHY-765: Topics in Advanced Astrophysics		Number of credit points (CP): 12		
Module type (mandatory or elective)	Depends on course of study			
Content and objective of module:	<p>Contents:</p> <p>The student selects four classes (each comprising of a lecture + seminar) on specialized topics in advanced astrophysics. Examples include classes on the topic areas of the composition and structure of stars, the physics of the sun, planetary science, stellar dynamics, interstellar and intergalactic medium, galactic development, active galactic nuclei, and cosmology.</p> <p>Objectives:</p> <p>1. Subject competencies</p> <ul style="list-style-type: none"> The students possess a deeper understanding of specialized topics in advanced astrophysics. The students can fully penetrate the content of current research literature on specialized topics in advanced astrophysics and place it in a broader scientific context. <p>2. Methodological competencies</p> <ul style="list-style-type: none"> The students can discuss and present original publications in astrophysics scientifically. The students can pose questions of their own on specialized fields of astrophysics and self-sufficiently develop research projects using appropriate methods. <p>3. Performance competencies</p> <ul style="list-style-type: none"> The students can present and explain the content of original publications to other students. The students are capable of self-sufficiently researching original publications in order to achieve a deeper specialized understanding. 			
Module (partial) exam(s) (number, form, scope):	Oral exam (45 min)			
Independent study time (in hours):	240			
Courses (type of teaching)	Contact time (in semester hours)	Supplementary exam work (Number, form, scope)		Module (partial) exam(s) (Number, form,
		For completing the module	For admission to the module exam	
Lecture and seminar (lecture and seminar)	2	-	-	-
Lecture and seminar (lecture and seminar)	2	-	-	-
Lecture and seminar (lecture and seminar)	2	-	-	-
Lecture and seminar (lecture and seminar)	2	-	-	-
Offered:	Every semester			
Prerequisite for taking the module:	None			
Teaching unit:	Physics			

PHY-775: Supplementary Topics		Number of credit points (CP): (CP): 6		
Module type (mandatory or elective)	Depends on course of study			
Content and objective of module:	<p>Contents:</p> <p>The students select a lecture and seminar on supplementary fields of astrophysics. In addition to physics classes, examples include lectures/seminars on topics in mathematics, biology, earth sciences, and computer science.</p> <p>Objectives:</p> <ol style="list-style-type: none"> 1. Subject competencies <ul style="list-style-type: none"> • The students possess a basic understanding of subject areas related to astrophysics. 2. Methodological competencies <ul style="list-style-type: none"> • The students can develop questions of their own in fields supplementary to astrophysics. 3. Performance competencies <ul style="list-style-type: none"> • The students can transfer specialized knowledge from fields associated with astrophysics to the context of astrophysical questions. 			
Module (partial) exam(s) (number, form, scope):	An examination in one of the following forms: Oral exam, 20 min Term paper, 10 pages			
Independent study time (in hours):	120			
Courses (type of teaching)	Contact time (in semester hours)	Supplementary exam work (Number, form, scope)		Module (partial) exam(s) (Number, form,
		For completing the module	For admission to the module exam	
Lecture (lecture)	2	-	-	-
Seminar (seminar)	2	-	-	-
Offered:	Every semester			
Prerequisite for taking the module:	None			
Teaching units offered:	Physics (50%) Biology/Biochemistry (10%) Chemistry (10%) Earth sciences (10%) Computer science (10%) Mathematics (10%)			

PHY-941: Introductory Project		Number of credit points (CP): 18		
Module type (mandatory or elective)	Depends on course of study			
Content and objective of module:	<p>Contents:</p> <p>The students select an upper-level seminar and an introductory project in the same topic area. The topic of the introductory project generally corresponds to their specialization area for their Master's thesis.</p> <p>Objectives:</p> <ol style="list-style-type: none"> Subject competencies <ul style="list-style-type: none"> The students are capable of familiarizing themselves with the current of state of research in a specific subfield of their specialization areas. Having done so, the students can work self-sufficiently on an assigned scientific question. Methodological competencies <ul style="list-style-type: none"> The students can summarize the findings of the introductory project concisely in a report. The students are capable of compiling the findings from the introductory project for a presentation and specialized discussion. Performance competencies <ul style="list-style-type: none"> The students are capable of discussing complex issues in physics with others. The students develop strategies of their own for preparing specialized literature, expressing scientific issues, and using media effectively. 			
Module (partial) exam(s) (number,	Seminar presentation, 45 min			
Independent study time (in hours):	380			
Courses (type of teaching)	Contact time (in semester hours)	Supplementary exam work (Number, form, scope)		Module (partial) exam(s) (Number, form,
		For completing the module	For admission to the module exam	
Upper-level seminar (seminar)	2	-	-	-
Lab (15 weeks) (lab)	Supervision: 30 hr	Lab report	-	-
Offered:	Every semester			
Prerequisite for taking the module:	None			
Teaching unit:	Physics			

PHY-942: Research Training		Number of credit points (CP): 12		
Module type (mandatory or elective)	Depends on course of study			
Content and objective of module:	<p>Contents:</p> <p>The students carry out a supervised independent study and a guided lab in the field of the Master's thesis. The supervision and guidance are provided in regular consultations with the supervisor(s).</p> <p>Objectives:</p> <p>1. Subject competencies</p> <ul style="list-style-type: none"> The students are capable of familiarizing themselves with the current state of research in a specific subfield of their specialization areas. Having done so, the students can work self-sufficiently on an assigned scientific question. <p>2. Methodological competencies</p> <ul style="list-style-type: none"> The students can summarize the findings of the introductory project concisely in a report. The students are capable of compiling the findings from the introductory project for a presentation and specialized discussion. <p>3. Performance competencies</p> <ul style="list-style-type: none"> The students are capable of discussing complex issues in physics with others. The students develop strategies of their own for preparing specialized literature, expressing scientific issues, and using media effectively. 			
Module (partial) exam(s) (number, form, scope):	<p>An examination in one of the following forms:</p> <p>Oral consultation, 30 min, not graded</p> <p>Lab report, 20 pages, not graded</p>			
Independent study time (in hours):	330			
Courses (type of teaching)	Contact time (in semester hours)	Supplementary exam work (Number, form, scope)		Module (partial) exam(s) (Number, form,
		For completing the module	For admission to the module exam	
Research lab (3 days/week) (lab)	Supervision: 30 hr	-	-	-
Offered:	Every semester			
Prerequisite for taking the module:	None			
Teaching unit:	Physics			