



### COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
Analysis of astrospectroscopic data	

Academic staff	Core academic unit(s)
<b>Coordinating:</b> Dr. Markus Ambrosch  <b>Other:</b>	Faculty of Physics

Study cycle	Type of the course unit
Second	Optional

Mode of delivery	Semester or period when it is delivered	Language of instruction
Auditorial	3 <sup>rd</sup> semester	English

Requisites	
<b>Prerequisites:</b> Astrophysics Python programming	<b>Co-requisites (if relevant):</b>

Number of ECTS credits allocated	Student's workload (total)	Contact hours	Individual work
5	140	64	76

Purpose of the course unit		
The purpose of this module is to get the student acquainted with different methods of spectroscopic data analysis and their application to interpret observed properties of stars.		
Learning outcomes of the course unit	Teaching and learning methods	Assessment methods
Ability to understand methods of spectroscopic data analysis	Problem teaching, autonomous work	Assessment of laboratory work, written and oral examination
Ability to use different software packages of spectroscopic data analysis	Problem teaching, autonomous work	Assessment of laboratory work, written and oral examination
Ability to interpret observed properties of stars applying different methods of spectroscopic data analysis	Problem teaching, autonomous work	Assessment of laboratory work, written and oral examination

Content	Contact hours			Individual work: time and assignments	
	Lectures	Laboratory work	Contact hours, total	Individual work	Tasks for individual work
1. Stellar model atmospheres and corresponding software packages.	4	12	16	16	Preparation of laboratory work
2. Methods of spectroscopic data analysis and corresponding software packages.	4	12	16	20	Preparation of laboratory work
3. NLTE methods of spectroscopic data analysis and corresponding software packages.	2	6	8	10	Preparation of laboratory work
4. Classical and Machine Learning Methods for automatic spectroscopic data analysis and corresponding software package	6	18	24	30	Preparation of laboratory work
<b>Total</b>	<b>16</b>	<b>48</b>	<b>64</b>	<b>76</b>	

Assessment strategy	Weight %	Deadline	Assessment criteria
Examination	50	During the exam session	Understanding of the main topics of the module
Laboratory work	50	Presentation during the final lecture of the module	Understanding of the main astrophysical phenomena and processes and their interaction which was discussed during laboratory work, understanding of a wider astrophysical context in relation to the module topic.

Author (-s)	Publishing year	Title	Publishing house or web link
<b>Required reading</b>			
Gray, D.F.	2005	The Observation and Analysis of Stellar Photospheres	Cambridge University Press
<b>Recommended reading</b>			
Tennyson, J.	2011	Astronomical Spectroscopy	World Scientific
Müller, A; Guido, S	2018	Introduction to Machine Learning with Python: a guide for data scientists	O'Reilly Media