



COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
Instruments and methods in astrospectroscopy	

Academic staff	Core academic unit(s)
Coordinating: dr. Vidas Dobrovolskas	Faculty of Physics

Study cycle	Type of the course unit
Second (Master)	Optional

Mode of delivery	Semester or period when it is delivered	Language of instruction
Face-to-face	Semester 2	Lithuanian / English

Requisites	
Prerequisites: Astrophysics	Co-requisites (if relevant):

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 spectrographs, raw data reduction procedures and different spectroscopic databases, to investigate relations between observational data and theoretical models seeking to understand and explain processes taking place in stars.		
Learning outcomes of the course unit	Teaching and learning methods	Assessment methods
Ability to understand working principles of different spectrographs and their differences.	Problem teaching, autonomous work.	Assessment of laboratory work, written examination.
Ability to use modern spectroscopic databases for solution of astrophysical problems.	Problem teaching, autonomous work.	Assessment of laboratory work, written examination.
Ability to run independently all steps of spectroscopic data reduction and data preparation for scientific analysis.	Problem teaching, autonomous work.	Assessment of laboratory work, written examination.

Content	Contact hours							Individual work: time and assignments	
	Lectures	Tutorials	Seminars	Workshops	Laboratory work	Internship	Contact hours, total	Individual work	Tasks for individual work
1. Spectra as source of information about physical properties of different astronomical objects.	4		4				8	8	Preparation of laboratory work.
2. Modern UV-IR spectrographs. Echelle spectrographs. Multi-object	4		16				20	24	Preparation of laboratory work.

spectrographs. Modern spectroscopic data archives.									
3. Procedures of spectroscopic data reduction.	4		16				20	24	Preparation of laboratory work.
4. Methods of spectroscopic analysis of stellar atmospheres.	4		12				16	20	Preparation of laboratory work.
Total	16		48				64	76	

Assessment strategy	Weight %	Deadline	Assessment criteria
Exam	50	During the exam session.	Understanding the main topics of the course.
Seminars	50	Presentation during the final lecture of the module.	Understanding of the main astrophysical phenomena, 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	Issue of a periodical or volume of a publication	Publishing house or web link
Required reading				
Gray, D. F.	2005	The Observation and Analysis of Stellar Photospheres	-	Cambridge University Press
Recommended reading				
Appenzeller, I.	2013	Introduction to Astronomical Spectroscopy	-	Cambridge University Press