

DOCTORAL STUDIES COURSE UNIT DESCRIPTION

Name of subject	Scientific Field	Faculty	Center/Institute/ Department
Astrospectroscopy (8 ECTS credits)	Physics N 002	Faculty of Physics	Institute of Theoretical Physics and Astronomy, Astronomical Observatory
Student's workload	Hours	Student's workload	Hours
Lectures		Consultations	
Individual study	160	Seminars	40

Course annotation			
<p>Diversity of modern astrospectroscopy methods. Spectral properties of astrophysical objects at different wavelength ranges.</p> <p>Stellar spectroscopy: spectra of normal stars and their analysis; spectra of peculiar stars and their analysis; influence of non-stationar phenomena on spectral line formation. Particularities of stellar parameter determinations: atmospheric parameters; abundances of chemical elements; elemental isotope ratios; measurements of radionuclides.</p> <p>Spectroscopy of stellar populations. Integral spectra of stellar populations: globular stellar clusters; galaxies; active galaxies and quasars. Spectroscopic methods for determining of stellar population characteristics: age, metallicity, kinematic parameters. Practical possibilities of modern astrospectroscopy.</p> <p>Software packages for spectral reductions, for chemical composition studies using spectral line equivalent widths; for spectrum syntheses. Specific software packages for spectral analyses. Archives of stellar spectra, services of virtual observatories, standartization questions. Databases of input parameters for stellar spectra analyses.</p>			
List of literature			
<ol style="list-style-type: none"> 1. J. Tennyson. <i>Astronomical Spectroscopy</i>. World Scientific. 2011, 223 p. 2. R. O. Gray and C. J. Corbally. <i>Stellar spectral classification</i>. Princeton University Press. 2009, 592 p. 3. D. F. Gray. <i>The observation and analysis of stellar photospheres</i>. Cambridge University Press. 2005, 470 p. 4. D. Emerson. <i>Interpreting Astronomical Spectra</i>. Jon Wiley & Sons Ltd. 1997, 461 p. 			
List of additional literature			
<ol style="list-style-type: none"> 1. D. Clayton. <i>Isotopes in the Cosmos</i>. Cambridge University Press. 2003, 314 p. 2. <i>3D Spectroscopy in Astronomy</i>. Eds. E. Mediavilla, S. Arribas, M. Roth, J. Cepa-Nogue, F. Sanchez. Cambridge University Press. 2010, 271 p. 3. C. R. Kitchin. <i>Optical Astronomical Spectroscopy</i>. Institute of Physics Publishing, Bristol and Philadelphia. 1995, 270 p. 			
Consulting teachers	Scientific degree	Pedagogical name	Main scientific works published in a scientific field in last 5 year period
Gražina Tautvaišienė	habil. Dr.	Prof.	1. Lagarde, N.; Reylé, C.; Robin, A. C.; Tautvaišienė, G.; Drazdauskas, A.; Mikolaitis, Š.; Minkevičiūtė, R.; Stonkutė, E.; Chorniy, Y.; Bagdonas, V.; Miglio, A.; Nasello, G.; Gilmore, G.; Randich, S.; Bensby, T.;

		<p>Bragaglia, A.; Flaccomio, E.; Francois, P.; Korn, A. J.; Pancino, E.; Smiljanic, R.; Bayo, A.; Carraro, G.; Costado, M. T.; Jiménez-Esteban, F.; Jofré, P.; Martell, S. L.; Masseron, T.; Monaco, L.; Morbidelli, L.; Sbordone, L.; Sousa, S. G.; Zaggia, S., The Gaia-ESO Survey: impact of extra mixing on C and N abundances of giant stars, 2019, <i>Astronomy & Astrophysics</i>, Volume 621, id.A24, pp.</p> <p>2. Mikolaitis, Š.; Tautvaišienė, G.; Drazdauskas, A.; Minkevičiūtė, R.; Klebonas, L.; Bagdonas, V.; Pakštienė, E.; Janulis, R., 2018, <i>Spectroscopy of Dwarf Stars Around the North Celestial Pole // Publications of the Astronomical Society of the Pacific</i>, Volume 130, Issue 989, pp. 074202.</p> <p>3. Pancino, E.; Romano, D.; Tang, B.; Tautvaišienė, G.; Casey, A. R.; Gruyters, P.; Geisler, D.; San Roman, I.; Randich, S.; Alfaro, E. J.; Bragaglia, A.; Flaccomio, E.; Korn, A. J.; Recio-Blanco, A.; Smiljanic, R.; Carraro, G.; Bayo, A.; Costado, M. T.; Damiani, F.; Jofré, P.; Lardo, C.; de Laverny, P.; Monaco, L.; Morbidelli, L.; Sbordone, L.; Sousa, S. G.; Villanova, S., 2017, <i>The Gaia-ESO Survey. Mg-Al anti-correlation in iDR4 globular clusters // Astronomy & Astrophysics</i>, Volume 601, id. A112, 10 pp.</p> <p>4. Tautvaišienė, G., Drazdauskas, A., Bragaglia, A., Randich, S., Ženovienė, R., 2016, <i>CNO abundances and carbon isotope ratios in evolved stars of the open clusters NGC 2324, NGC 2477, and NGC 3960 // Astronomy & Astrophysics</i>, Volume 595, id.A16.</p> <p>5. Drazdauskas, A., Tautvaišienė, G., Smiljanic, R., Badgonas, V., Chorniy, Y. <i>Chemical composition of evolved stars in the young open clusters NGC 4609 and NGC 5316</i>, 2016, <i>Monthly Notices of the Royal Astronomical Society</i>, 462, 794.</p>
<p>Certified during Doctoral Committee session 02/02/2022, protocol No. (7.17 E) 15600-KT-32</p>		
<p>Committee Chairman prof. S. Juršėnas</p>		