Study programmes: Astronomy and astrophysics	
Course name: Internet and software packages in astronomy	
Lecturer: Stevo Šegan	
Status: Optional	
ECTS: 8	
Attendance prerequisite: None	
Course aims: Training a student for the development and application of scientific and professional achievements in the field of astronomical observations using appropriate software packages.	
Couse outome: Training a student for further specialization and independent scientific and professional work with the use of modern computer technologies.	

Course content

Software packages IDL, MATHEMATICA, MATHTRANS, MATLAB and similar. Optimization methods in the conditions of the cosmic flight and interplanetary stations, planetary modules, low energy balance and resources. Gyroscope and laser stabilization. Wireless communication. Internet methods INTERSAT and INTERPLANET. Classic and new protocols in data transfer. Methods LSQ (MNK) and software for singular decomposition, Kalman filter. Analysis and spectral analysis; time series analysis; overview of conventional methods and software tools in the INTERPLANET INTERNET environment. Software development and methods for processing incomplete data; sonograms; interpolation and ephemeral accounts. Statistics and statistical distributions; multi-dimensional statistics, stellar statistics; galactic statistics. Color space and limitations in character processing; methods of composition, compression and visualization of characters; *rawtracing* formats and convention grid indexing; spatial models 3D2S; fractal account; solenoid and star fractals; database of celestial bodies and systems.

Literature:

D. Mills, Interplanetary INTERNET, 1996;

Wolphram inc., MATHEMATICA 2008;

A. Albert, Regression, pseudo-regression and recurrent evaluation, 1977;

H. Moritz, Advanced Physical Geodesy, 1980; P. Bourke, Image and data processing, 2004;

P. Lena, Image Processing, 1992.

I. A. Fransis, A survey of statistical software, 1983;

Trumpler and Weaver, Statistical Astronomy, 1953.

S. Shegan: A set of 5 lessons from the Special Software

Literature for exercises:

Learning Matlab, The MathWorks, Inc.

Number of hours: 5	**Theoretical:** 3+2 (lectures + exercises)	**Lab and practical:** 2 (SIR)

Teaching and learning methods:

Alternative consulting group method and frontal group method; permanent (special and individual) practical method; interactive seminar method.

Assessment (maximal 100 points)			
Course assignments	**points**	**Final exam**	**points**
Lectures	20	Written exam	0
Exercises / Tutorials	30	Oral exam	20
Colloquia	-	Written-oral exam	-
Essay / Project	30		