

Study programmes: PhD studies – Astronomy and Astrophysics				
Course name: Application of super-computers in astronomy				
Lecturers: Bojan Novaković				
Status: Optional				
ECTS: 9				
Attendance prerequisites: None				
Course aims: The acquisition of general and specific knowledge about the application of super-computers in astronomy				
Course outcome: Upon completion of the course, student has all the necessary knowledge for further scientific work, whether the work is focused on the development of methods and tools for the application of super-computers, or based on their application				
Course content: 1.The architecture of modern super-computers; 2.Parallel programming (basic methods and techniques of parallel programming); 3.Astronomical database; 4.Data mining in astronomy (review of techniques of data mining, the application of data mining in astronomy, current trends in the data mining); 5.Graphics processing units (GPUs) (basic principles, an overview of the hardware, the advantages and disadvantages, CUDA); 6.Examples of N-body simulations in astronomy and astrophysics				
Literature: 1. J. J. Dongarra and A. J. van der Steen: High-performance computing systems: Status and outlook , <i>Acta Numerica</i> , Vol. 21, pp 379-474, Cambridge University Press, 2012 2. Georg Hager and Gerhard Wellein: Concepts of High Performance Computing , Friedrich-Alexander-Universität Erlangen-Nürnberg, 2008 3. Yuen, D.A., Wang, L., Chi, X., Johnsson, L., Ge, W., Shi, Y. (Eds.): GPU Solutions to Multi-scale Problems in Science and Engineering , Springer; 2013				
Note: Teacher may add other appropriate literature				
Number of hours: 10		Lectures: 4	Tutorials: 6	
Teaching and learning methods: Frontal, Group, <i>Individual Research</i> Approach				
Assessment (maximal 100 points)				
Course assignments		points	Final exam	points
Lectures		10	Written exam	-
Exercises / Tutorials		-	Oral exam	40
Colloquia		-	Written-oral exam	-
Essay / Project		50		