Study programmes: Astronomy and Astrophysics - PhD studies	
Course name: Supercomputers Application 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, students have the necessary knowledge for further scientific work related to integrating and adapting astronomical algorithms for their application on high-performance computing (HPC) infrastructure. They also understand the role of administration, workload and resource management in an HPC management software. Students also understand the mechanisms for evaluating the suitability of different HPC solutions to solving scientific problems.	
Course content: **1. The architecture of modern super-computers**; **2. Parallel programming** (basic methods and techniques of parallel programming); **3. Astronomical databases**; **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. Georg Hager and Gerhard Wellein: **Concepts of High Performance Computing,** Friedrich-Alexander-Universitat Erlangen-Nurnberg, 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:** Lecturer may add other appropriate literature	

Number of hours: 10	Lectures: 4	Tutorials: 6
Teaching and learning methods: Frontal, Group, *Individual Research* 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		