Module: Elective Advanced Lectures: Theoretical Physics

Module No.: physics70c

Course: High performance computing: Modern computer architectures and applications in the physical science (T)

Course No.: physics7505

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture	English	2	3	WT/ST

Requirements for Participation:
Knowledge of a modern programming language like C/C++

Preparation:

Form of Testing and Examination:
oral examination

Length of Course:
1 semester

Aims of the Course:
Understanding principles of modern computer architectures and their usage and programming for scientific problems

Contents of the Course:
Computer architectures and system components (CPU, memory, network)
Software environment
Parallel architectures and parallel programming paradigms (MPI, OpenMP/threads)
High Performance Computing

Recommended Literature:
John L. Hennessy, David A. Patterson: Computer Architecture - A Quantitative Approach. Morgan Kaufmann Publishers, 2012
David A. Patterson, John L. Hennessy: Computer Organization and Design - The Hardware / Software Interface. Morgan Kaufmann Publishers, 2013
W.H. Press et al.: Numerical Recipes in C (Cambridge University Press)
Message Passing Interface Forum: MPI: A Message-Passing Interface Standard, Version 3.1
OpenMP Application Programming Interface, Version 4.5, November 2015