

**Module: Elective Advanced Lectures:
Theoretical Physics**

Module No.: physics70c

Course:  universität**bonn**

**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