Module Name
High Performance Computing

Type of Module	**Module Code**
Advanced Module	AM-HPC

Identification Number	**Workload**	**Credit Points**	**Term**	**Offered Every**	**Start**	**Duration**
MSc-I-HPC	180 Hours	6 CP	1. – 3. Semester	SuSe	Summer term only	1 Semester

1	**Course Types**	**Contact Time**	**Private Study**	**Planned Group Size**
	a) Lecture	30 h	60 h	No limits
	b) Exercise	30 h	60 h	

2 Module Objectives and Skills to be Acquired

Students are familiar with important parallel algorithms from different task areas of parallel and high-performance computing, especially from the environment of scientific computing. They are able to assess their applicability in common scenarios, are familiar with their essential performance characteristics and are also able to evaluate the parallel scalability of these and similar algorithms in particular. Students are also able to implement known algorithms using a parallel programming model.

3 Module Content

The lecture covers a selection of algorithms from the following classical problem areas of scientific computing ("the seven dwarfs of HPC"):

- Solvers for partial differential equations (and related problems) on structured and unstructured grids.
- algorithms of numerical linear algebra on sparse and dense matrices
- Particle-oriented simulation methods
- spectral methods (e.g. parallel fast Fourier transform, etc.)
- stochastic methods (Monte Carlo simulation, etc.)

4 Teaching Methods

Lecture, Exercise

5 Prerequisites (for the Module)

Formally: None

6 Type of Examination

Written exam or oral exam

7 Credits Awarded

Passing the exam

8 Compatibility with other Curricula

M.Sc. Mathematik, M.Sc. Wirtschaftsmathematik, M.Sc. Information Systems

9 Proportion of Final Grade

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10 Module Coordinator

The tutors of the Institute for Computer Science

11	**Further Information**