

Modules: ECThPhysics **Elective Courses Theoretical Physics**
 physics70c **Elective Advanced Lectures: Theoretical Physics**

Course:  **Computational Physics (T)**

Course No.: physics760

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises and project work	English	2+2+1	7	WT/ST

Requirements for Participation:

Knowledge of a modern programming language (like C, C++)

Preparation:

Theoretical courses at the Bachelor degree level

Form of Testing and Examination:

successful participation in exercises,
 presentation of an independently completed project

Length of Course:

1 semester

Aims of the Course:

ability to apply modern computational methods for solving physics problems

Contents of the Course:

Statistical Models, Likelihood, Bayesian and Bootstrap Methods
 Random Variable Generation
 Stochastic Processes
 Monte-Carlo methods
 Markov-Chain Monte-Carlo

Recommended Literature:

W.H. Press et al.: Numerical Recipes in C (Cambridge University Press)
<http://library.lanl.gov/numerical/index.html>
 C.P. Robert and G. Casella: Monte Carlo Statistical Methods (Springer 2004)
 Tao Pang: An Introduction to Computational Physics (Cambridge University Press)
 Vesely, Franz J.: Computational Physics: An Introduction (Springer)
 Binder, Kurt and Heermann, Dieter W.: Monte Carlo Simulation in Statistical Physics (Springer)
 Fehske, H.; Schneider, R.; Weisse, A.: Computational Many-Particle Physics (Springer)