

Computer science technologies

1. Basic knowledge of principles of scripting languages using Unix (Linux) shell as an example.
2. Main concepts of the object-oriented programming (classes, instances, methods, inheritance) using one of the commonly known high-level languages as an example (e.g. C++, Java).
3. Principles and usage of the Internet protocols: basic Internet layer (IP), Transmission Control Protocol (TCP) and application layer secure shell (SSH).
4. Fundamentals of the numerical calculus: numerical differentiation (2-point and 3-point formulae), numerical quadratures (Simpson formula), simplest schemes of solving differential equations (Euler schemes).
5. What are the Monte Carlo methods and what are they used for in physics: principles and practice? In particular: random and pseudorandom numbers generation, transformation of probability distributions, Monte Carlo estimation, reduction of variance.