# **COURSE DETAIL**

### SCIENTIFIC COMPUTING

**Country** Denmark

**Host Institution** University of Copenhagen

**Program(s)** University of Copenhagen

UCEAP Course Level Upper Division

**UCEAP Subject Area(s)** Mathematics Computer Science

**UCEAP Course Number** 175

**UCEAP Course Suffix** 

UCEAP Official Title SCIENTIFIC COMPUTING

UCEAP Transcript Title SCIENTIFIC COMPUTNG

**UCEAP Quarter Units** 6.00

**UCEAP Semester Units** 4.00

#### **Course Description**

This course is a study of the general techniques and ideas found in professionally written numerical software, as well as the general concepts students need to know to apply suitable software to computational problems. The course is designed more for potential users of mathematical software than for potential creators of such software. At the completion of the course, students are able to choose an appropriate numerical method to solve a problem, and evaluate the numerical method with respect to potential accuracy, computational efficiency, and memory requirements. Students are also taught to perform the required computations using Matlab or similar systems, and then evaluate the quality of the solution with respect to the accuracy obtained and the sensitivity to model parameter variations. They then estimate whether the quality of the solution is adequate relative to the desired use of the model, and analyze the reasons behind a possible total failure of a method when applied to a concrete problem. This course also covers simple mathematical models from science and numerical analyses of them. Students learn about fundamental numerical methods for the solution of linear and nonlinear equations, linear and nonlinear optimization, eigenvalue problems, initial value problems for ordinary differential equations, partial differential equations, and the fast Fourier transform.

## Language(s) of Instruction

English

Host Institution Course Number NDAA07012U

Host Institution Course Title SCIENTIFIC COMPUTING

**Host Institution Campus** 

Science

**Host Institution Faculty** 

**Host Institution Degree** 

## Host Institution Department

Niels Bohr Institute; Chemistry

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