Course: Programming in Octave/MATLAB — credits: 5

Course code	LSVX23OCTAVEMATL
Name	Programming in Octave/MATLAB
Study year	2026-2027
ECTS credits	5
Language	Dutch, with parts in English
Coordinator	D.R.M. Langers

Modes of delivery	Lecture Teaching method 1 Tutorial
Assessments	Programming in Octave/MATLAB - Other assessment

Learning outcomes

This module has the following learning outcomes

You write scripts in Octave/MATLAB that use operations, flow control, standard functions, custom functions, file I/O and visualisation

You efficiently perform vectorised calculations by manipulating matrices as units

You simulate complex emergent behaviour based on a cellular automaton in Octave/MATLAB

You explain the formulations of diverse cellular automata in the context of biology, chemistry, physics, or computer science

You characterise the behaviour of a model or simulation by targeted experimentation with initial configurations and parameters

You collaborate effectively with fellow students from diverse natural science backgrounds

Content

You will be introduced to the MATLAB-compatible programming language (GNU) Octave for the purpose of performing simulations with data organised in multidimensional grids. First, based on available notebooks and online material, you will learn the basic syntax of the programming language with regard to operators, flow control and functions, and use single and compound data types such as vectors, matrices, and multidimensional arrays or cell arrays. With this knowledge, you implement some discrete models based on cellular automata, also using visualisations and file I/O. You discover that models based on deceptively simple basic rules can lead to highly complex emergent behaviour on a larger scale. Initially, you do this individually by implementing and exploring a "toy model", such as the well-known Conway's Game Of Life. Later, in small mixed groups, you also construct more relevant discrete natural science models with practical applications in biology, chemistry, physics, computer science, or possibly a proposal of your own. You will present final results in the form of an interactive digital demonstration set-up with accompanying documentation in the form of a wiki.

Included in programme(s)

Major Medical Diagnostics
Major Biology and Medical Research
Bio-Informatics
Chemistry
Chemical Engineering

School(s)

Engineering, Life Sciences & ICT

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