NEA
NUCLEAR ENERGY AGENCY

OpenMC

Class Title: OpenMC

24–28 November 2025

OECD Headquarters in Paris, France

Minimum enrollment required: 12 participants
Course fee: 2000 EUR

This 4.5-day class is intended to give students a thorough introduction to the usage and application of the OpenMC Monte Carlo code. The course will be interactive and students will work hand-in-hand with the instructors to develop models, run the code, and explore a wide variety of features. Time will also be allotted to discuss individual questions and work through student-motivated examples.

Topics to be covered include:

- **Installation**: Compiling and installing; the Python API; optional dependencies
- **Geometry**: constructive solid geometry; universes and lattices; CAD-based geometry
- **Sources**: statistical distributions, source options; surface sources
- **Tallies**: filters, scores, and tallies; cell instances; meshes; cell-under-voxel
- **Variance reduction**: weight windows; random ray solver; CADIS/FW-CADIS
- **Post-processing**: working with statepoint files; Pandas dataframes; tally arithmetic
- **Nuclear data**: cross section configuration; introspection of data; automated data generation; cross section visualization
- **Depletion**: depletion operators; time integration methods; activation calculations; decay sources
- **Applications**: Shutdown dose rate calculations with R2S and D1S; volume calculations; multigroup cross section generation
- **Visualization**: Geometry and tally visualization with the OpenMC plotter application
- **Coupling**: C/C++ API, multiphysics calculations

The class will be based on the latest version of OpenMC as of the start of the class. Students will need to bring a laptop to participate in the course. It is **not** required to have OpenMC installed on their laptop; however, students are welcome to install OpenMC in advance. Those who do not have OpenMC installed on their machine will be provided with a cloud-based Jupyter notebook interface accessible through an internet browser.

Students are expected to have basic knowledge and familiarity with Python 3. Resources for learning basic Python will be provided in advance.