BNEN, the Belgian Nuclear higher Education Network
Master-after-master programme in nuclear engineering

Course Outline
BNEN, the Belgian Nuclear higher Education Network organises a one-year (60 ECTS) master-after-master programme in nuclear engineering. BNEN is organised through a consortium of six Belgian universities and the Belgian Nuclear Research Centre, SCK•CEN.

The primary objective of the BNEN programme is to educate young engineers in nuclear engineering and its applications and to develop and maintain high-level nuclear competences in Belgium and abroad. BNEN catalyses networking between academia, research centres, industry and other nuclear stakeholders.

The courses of the BNEN programme are available (**without registration fee)** to participants with scientific background in the framework of the ANNETTE project. Participants can choose *one or a couple* of individual courses of the BNEN programme to integrate in their total course programme. Upon completion of a course, a certificate without legal value stating that a student completed the course(s) successfully, can be provided by BNEN. In order to also get the ECTS for the course, the participant should register at one of the partner universities in Belgium. In order to be admitted to the *complete* BNEN programme (meaning the 60 ECTS advanced master), the usual admission criteria and application process, described on the BNEN website, should be followed.

BNEN Programme
The BNEN one-year progamme of 60 ECTS includes compulsory modules, elective modules and a master thesis.

Compulsory modules (31 ECTS)
Exercises and hands-on sessions in the specialised laboratories of SCK•CEN complement the theoretical classes and strengthen the development of nuclear skills and attitudes in a research environment. Various technical visits are organised to research and industrial nuclear facilities.

- Introduction to nuclear energy (3 ECTS)

- Introduction to nuclear physics and nuclear measurements (3 ECTS)

- Nuclear materials (3 ECTS)

- Nuclear fuel cycle (3 ECTS)

- Radiation protection (3 ECTS)

- Nuclear thermal hydraulics (5 ECTS)

- Nuclear reactor theory (6 ECTS)

- Safety of nuclear powerplants (5 ECTS)

Elective modules (9 ECTS to be chosen from the list below)
The compulsory modules are chosen in such a way that the bulk of the programme is focused on nuclear engineering. By introducing the option of at least three elective courses, the BNEN students have the possibility to choose either a direction into 'power generation' or either into 'radioprotection/radioecology /…'.

- Advanced nuclear reactor physics and technology (3 ECTS)

- Advanced nuclear materials (3 ECTS)

- Advanced radiation protection radiation ecology (3 ECTS)

- Advanced courses of the nuclear fuel cycle (3 ECTS)

- Nuclear and radiological risk governance (3 ECTS)

- Advanced course elective topic (3 ECTS)

Master thesis (20 ECTS)
The master thesis is an essential part of the programme, where the students have to apply the compentences they have acquired during the year on a specific research project of their choice. The subjects can be chosen in a large domain of nuclear engineering related topics, that are directly linked to the R&D programme of SCK•CEN, research of the professors at the partner universities, or operational problems in industry.

Details
All teaching activities take place at SCK•CEN. Courses are organised in English and in a modular way; teaching in blocks of one to three weeks for each module allows optimal time management for students and lecturers, facilitates registration for individual modules, and allows easy access for international students.

Detailed description of Learning Outcomes, lecturer(s), content, course material, pre-assumed knowledge and examination of each module is reported at this link.

Date of availability of the BNEN programme
The BNEN academic year runs from September until the end of June. In the programme there are 24 weeks of courses and 11 weeks for project work and examinations.