

# Belgian Nuclear higher Education Network

Master of Science in Nuclear Engineering



The Belgian Nuclear higher Education Network, BNEN, 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.

The partners are, in alphabetical order

- Belgian Nuclear Research Centre (SCK•CEN)
- Katholieke Universiteit Leuven (KU Leuven)
- Université Catholique de Louvain (UCL)
- Université de Liège (ULg)
- Université Libre de Bruxelles (ULB)
- Universiteit Gent (UGent)
- Vrije Universiteit Brussel (VUB)

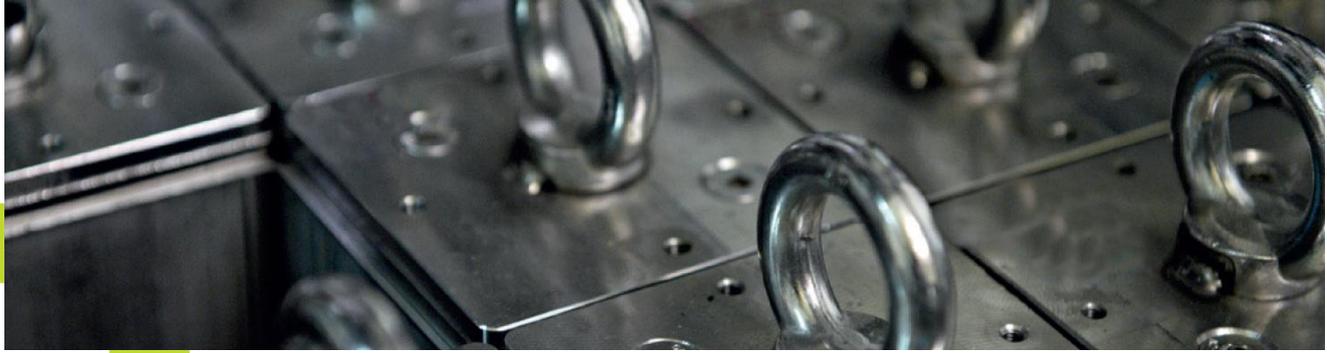
The primary objective of the BNEN programme is to educate young engineers in nuclear engineering and its applications and to develop and maintain high-level nuclear competences in Belgium and abroad. BNEN catalyses networking between academia, research centres, industry and other nuclear stakeholders.

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.



Vrije  
Universiteit  
Brussel

**KU LEUVEN**



## Programme content

The one-year programme was created in close collaboration with representatives of the utility companies and power plants and teaches students in all aspects of nuclear technology and its applications, creating nuclear engineering experts in the broad sense. 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.

The programme can be divided into three core blocks:

- A set of introductory courses allowing refreshing or first contact with the basic notions of nuclear physics, material sciences and the principles of energy production through use of nuclear phenomena.
- A core block of nuclear engineering applied to power generation and reactor use; theory of reactors and neutronics, thermal hydraulic problems encountered in reactor exploitation, the nuclear fuel cycle and the specific material-corrosion problems.
- A block of elective courses that allow students to deepen certain topics of their choice.

	ECTS
<b>Compulsory Modules</b>	<b>31</b>
Introduction to nuclear energy	3
Introduction to nuclear physics and measurements	3
Nuclear materials	3
Nuclear fuel cycle	3
Radiation protection	3
Nuclear thermal hydraulics	5
Nuclear reactor theory	6
Safety of nuclear powerplants	5
<b>Elective Modules</b>	<b>9</b>
Advanced nuclear reactor physics and technology	3
Advanced nuclear materials	3
Advanced radiation protection/radiation ecology	3
Advanced courses of the nuclear fuel cycle	3
Nuclear and radiological risk governance	3
Advanced course elective topic	3
<b>Master thesis</b>	<b>20</b>
<b>Total</b>	<b>60</b>



The master thesis is an essential part of the programme, where the students have to apply all the competences they acquire during the year on a research project. The subjects can be chosen in a large domain of nuclear engineering related topics, that are directly linked to the research of the professors, the R&D programme of SCK•CEN or operational problems in industry.

*BNEN is linked with university research, benefits from human resources and infrastructure of SCK•CEN and is encouraged and supported by the stakeholders of the nuclear sector.*

## How to apply

Please visit our website for details on the application procedure. Registration at one of the partner universities is only possible after being accepted to the programme by the BNEN Steering Committee.

All candidates will be screened by the Belgian Federal Agency for Nuclear Control for clearance and access to the nuclear infrastructure of SCK•CEN. Admission to the programme will depend on clearance and access being granted.

## Admission criteria

- Candidates holding a 5-year master degree in engineering from a Belgian university are automatically accepted to the BNEN programme.
- Applications from candidates having a master degree in sciences or industrial sciences from a Belgian university can be admitted upon successful completion of a make-up programme of approximately 30 ECTS, which will be created based on the specific background of the candidate.
- Applications from candidates holding a foreign degree of higher education will be treated on an individual basis by the BNEN Steering Committee and admission can be granted based on the academic and professional experience of the candidate.

## Scholarships

BNEN grants scholarships to selected full-time students, covering tuition and accommodation fees. Ranking is according to academic results.



## Venue

BNEN is organised at the technical site of SCK•CEN in Mol, 100km northeast of Brussels in Belgium. The lectures take place in a dedicated classroom in the conference centre of SCK•CEN (Lakehouse), located in a wooded area and nearby the SCK•CEN restaurant and library services. SCK•CEN offers a variety of accommodation options: houses, villas, studios and dormitories. For more information visit: [www.sckcen.be](http://www.sckcen.be) .

## BNEN Academic Calendar

- The BNEN academic year runs from September until the end of June.
- 17 weeks of courses
- 13 weeks for project work and examinations

## Sponsoring companies

BNEN thanks following organisations for their support to the programme.



**FANC AFNC**  
federaal agentschap voor nucleaire controle  
agence fédérale de contrôle nucléaire



**ONDRAF/NIRAS**



**BEL** ✓



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