



## Master complémentaire en génie nucléaire [MC-NUAP]

### Caractéristiques du programme

#### Compétences visées

The BNEN programme is a demanding programme where students with different high level backgrounds in engineering have to go through highly theoretical subjects like neutron physics, fluid flow and heat transfer modelling, and apply them to reactor design, nuclear safety and plant operation and control. As a more interdisciplinary level, the programme includes some important chapters of material science, with a particular interest for the fuel cycle. Radiation protection belongs also to the backbone of the programme.

Students are offered the opportunity to coherently take a part of their basic nuclear education at different places in Europe while cumulating credit units. Practical laboratory sessions and advanced subjects taught in a modular way are also offered to enrich the programmes. A special qualification of "European master" is planned to be awarded in the future to the students who will have obtained their degree with a substantial effort of mobility. The European Nuclear Education Network is taking care of the quality of the programmes including their professional relevance, the links with the research world and with the practical training organisations.

#### Structure du programme

The Master of Science in Nuclear Engineering is a one-year programme. The programme structure includes the possibility to spread it over two years, especially to accommodate young engineers working already in the nuclear sector.

The language of instruction is English (TOEFL score of 550 or proven equivalent required).

The programme consists of a set of general courses (see list) followed by some elective advanced courses, an internship and a master's thesis work.

The schedule of the programme will stimulate the students' mobility in the preparation of their master's thesis work : internship in industry, in research centres or in universities within Belgium or Europe.

The lectures are taught at the premises of the Belgian nuclear research centre SCK-CEN. The laboratory exercises make use of the nuclear facilities of SCK-CEN. Various technical visits are organised to research and industrial nuclear facilities.

#### Spécificités

The Belgian Nuclear higher Education Network (BNEN) combines the knowledge and experience in nuclear education of six major Belgian universities together with the Belgian nuclear research centre and offers a unique and broad master programme in nuclear engineering in close interaction with nuclear research and industry.

#### Information pratiques

**Equipes partenaires** The Master of Science in Nuclear Engineering is organized by the Belgian Nuclear Higher Education Network (BNEN), which consists of six major Belgian universities together with the Belgian nuclear research centre : - Katholieke Universiteit Leuven ; - Université Catholique de Louvain ; - Universiteit Gent ; - Université de Liège ; - Vrije Universiteit Brussel ; - Université Libre de Bruxelles.

**Horaire** : The Master of Science in Nuclear Engineering is a one-year programme. The programme structure includes the possibility to spread it over two years.

**Lieu d'enseignement** : The lectures are taught at the premises of the Belgian nuclear research centre SCK-CEN.

**Catalogue des cours** : <http://www.academiewb.be/catalogue/MC-NUAP.html>

**Où s'informer ? ULB - Faculté des Sciences appliquées Service de Métrologie Nucléaire Avenue F.D. Roosevelt 50, CP 165/84, 1050 Bruxelles**

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## Conditions d'accès

The Master of Science in Nuclear Engineering is open for students, on the basis of their diploma, holders of the degree of :

- "Burgerlijk ingenieur" and "Bio-ingenieur" from the Flemish Community ;
- "Ingénieur civil" and "Bio-Ingénieur" from the French Community ;
- "Burgerlijk ingenieur polytechnicus" from the "Koninklijke Militaire School" at Brussels ;
- "Ingénieur civil polytechnique" from the "Ecole Royale Militaire" at Brussels.

On the basis of a decision taken by the Teaching Committee based on the evaluation of previous studies and experiences of the candidates and subject to an entrance exam : candidates holding a different higher education degree of the second cycle of a university or a diploma of the second cycle of a non-university higher education from the Flemish or the French community (i.e. Licentiaat Wetenschappen, Licencié en Sciences, Industriel Ingenieur, Ingénieur Industriel,...).

Candidates holding a foreign degree of higher education can be admitted within the limits stipulated by the Decrees, after evaluation and approval of the Teaching Committee and with observance of the procedural rules of the respective participating universities.

## Jury d'examens

Président : Mme Jacqueline Lecomte-Beckers (ULg)

Secrétaire : M. Pierre-Etienne Labeau (ULB)

## Cursus

Année unique - **NUAP6**

## Année unique

Détail du nombre d'ECTS de cours par établissement d'accueil - Project and internship, TFE : 15 ECTS

Intitulés des cours	KUL	RUG	VUB	UCL	ULB	ULg	Titulaires
Nuclear energy: introduction	3	-	-	-	-	-	W. D'Haeseleer
Introduction to nuclear physics	-	-	3	-	-	-	A. Hermanne
Nuclear reactor theory en experiments	2	3	-	3	-	-	W. D'Haeseleer H. A. Abderrahim J.-M. Noterdaeme
Nuclear thermal-hydraulics	-	-	-	6	-	-	M. Giot
Operation and control	-	3	-	-	-	-	W. Van Hove G. Janssens-Maenhout
Reliability and safety	3	-	-	-	-	-	A. Poucet
Nuclear fuel cycle and applied radiochemistry	-	-	-	-	-	3	P. Mathieu
Nuclear materials I	-	-	-	-	-	3	J. Lecomte-Beckers
Nuclear materials II	3	-	-	-	-	-	W. Bogaerts, E. Van Walle
Radiation protection and nuclear measurements	-	4	2	-	-	-	H. Thierens, S. Tavernier
Advanced courses	-	-	-	-	4	-	P.-E. Labeau