

GNUC2MC

2015 - 2016

Advanced Master in Nuclear Engineering

Autre site - 60 credits - 1 year - Day schedule - In englishDissertation/Graduation Project : **YES** - Internship : **NO**Activities in English: **YES** - Activities in other languages : **NO**Activities on other sites : **YES**Main study domain : **Sciences de l'ingénieur et technologie**Organized by: **Ecole Polytechnique de Louvain (EPL)**Programme code: **gnuc2mc** - Francophone Certification Framework: 7**Table of contents**

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GNUC2MC - Introduction

Introduction

Introduction

The master offers:

- the possibility of acquiring the skills necessary for designing and operating electronuclear power plants;
- a specialisation in nuclear sciences and technologies;
- the skills necessary for understanding the functioning of today's reactors and those of the 4th generation;
- a training organised by six universities and the Belgian Nuclear Research Centre and recognised on the European level.

Your profile

This programme is open if you are a:

- Belgian civil engineering graduate;
- polytechnical civil engineering graduate from the Royal Military School in Brussels;
- graduate in exact sciences and applied sciences: on file.

Your programme

This programme is composed of a common core of 56 credits and 4 complementary credits to be chosen from amongst the advanced seminars whose organisation varies annually as a function of the high-level scientific experts present at the Research Centre in Mol.

GNUC2MC - Teaching profile

Learning outcomes

The objective of the Complementary Master's course in Nuclear Engineering is to enable students to acquire the high level skills needed to design and run electro-nuclear power stations, taking into account the legal prescriptions and regulations relating to the safety of these plants. In a wider perspective, to enable students to acquire a university-level specialisation in nuclear science and technology which is recognised at the European level

Programme structure

This program comprises a core curriculum of 56 credits and 4 complementary credits to be chosen from the advanced seminars, the organisation of which varies from year to year in function of the high level scientific skills present at the Research Centre in Mol. By way of example, the following seminars were organised in recent years:

- Advanced seminar on accelerators and time of flight experiments
- Radioisotopes
- Safeguards
- Nuclear energy, future prospects
- Electricity, energy vector of the future
- Recycling of previously radioactive material
- Emergency Planning
- Experience with full scale MCNP modeling of research reactors
- Minimising waste production in a complex nuclear center : from conception to the decommissioning, the SCK.CEN reference case.

This program is set out in detail on the website of SCK.CEN à Mol at the address : <https://www.sckcen.be/bnen/>

Core curriculum of the Complementary Master in Nuclear Engineering

Electives of the Complementary Master in Nuclear Engineering

> [Tronc commun du master complémentaire en génie nucléaire](#) [en-prog-2015-gnuc2mc-
[lgnuc210t.html](#)]

> [Cours au choix du master complémentaire en génie nucléaire](#) [en-prog-2015-gnuc2mc-
[lgnuc220o.html](#)]

GNUC2MC Detailed programme

Programme by subject

CORE COURSES [51.0]

○ Mandatory

⊗ Optional

△ Courses not taught during 2015-2016

⊙ Periodic courses not taught during 2015-2016

⊕ Periodic courses taught during 2015-2016

■ Activity with requisites

Click on the course title to see detailed informations (objectives, methods, evaluation...)

Le cours MECA 2648 est repris dans le programme interuniversitaire sous le sigle BNEN 2001.

○ LBNEN2000	Nuclear reactor theory (Centre d'étude nucléaire-Mol)	N.		6 Credits	2q
○ LBNEN2001	Nuclear thermal-hydraulics (Centre d'étude nucléaire-Mol)	N.		5 Credits	1q
○ LBNEN2002	Introduction to Nuclear Physics & Measurements (Centre d'étude nucléaire-Mol)	N.		3 Credits	1q
○ LBNEN2003	Safety of Nuclear Powerplants (Centre d'étude nucléaire-Mol)	N.		5 Credits	2q
○ LBNEN2006	Nuclear energy introduction (Centre d'étude nucléaire-Mol)	N.		3 Credits	1q
○ LBNEN2008	Nuclear Materials (Centre d'étude nucléaire-Mol)	N.		3 Credits	1q
○ LBNEN2010	Nuclear fuel cycle (Centre d'étude nucléaire-Mol)	N.		3 Credits	1q
○ LBNEN2011	Radioprotection (Centre d'étude nucléaire-Mol)	N.		3 Credits	1q
○ LBNEN2990	Travail de fin d'études	N.		20 Credits	

Cours au choix du master complémentaire en génie nucléaire [9.0]

● Mandatory

△ Courses not taught during 2015-2016

⊕ Periodic courses taught during 2015-2016

⊗ Optional

⊖ Periodic courses not taught during 2015-2016

■ Activity with requisites

Click on the course title to see detailed informations (objectives, methods, evaluation...)

⊗ LBNEN2020	Advanced Nuclear Reactor Physics and Technology (Centre d'étude nucléaire-Mol)	N.		3 Credits	2q
⊗ LBNEN2021	Advanced Nuclear Materials (Centre d'étude nucléaire-Mol)	N.		3 Credits	2q
⊗ LBNEN2022	Advanced Radioprotection / Radioecology (Centre d'étude nucléaire-Mol)	N.		3 Credits	1q
⊗ LBNEN2023	Advanced Fuel Cycle/Dismantling/Radiochemistry/MOX/Th (Centre d'étude nucléaire-Mol)	N.		3 Credits	2q
⊗ LBNEN2024	Nuclear and Radiological Risk Governance (Centre d'étude nucléaire-Mol)	N.		3 Credits	2q
⊗ LBNEN2025	Advanced Course Elective Topic (Centre d'étude nucléaire-Mol)	N.		3 Credits	2q

The programme's courses and learning outcomes

For each UCL training programme, a [reference framework of learning outcomes](#) specifies the competences expected of every graduate on completion of the programme. You can see the contribution of each teaching unit to the programme's reference framework of learning outcomes in the document "In which teaching units are the competences and learning outcomes in the programme's reference framework developed and mastered by the student?"

The document is available by clicking [this link](#) after being authenticated with UCL account.

GNUC2MC - Information

Admission

In the event of the divergence between the different linguistic versions of the present conditions, the French version shall prevail

Decree of 7 November 2013 defining the landscape of higher education and the academic organization of studies.
The admission requirements must be met prior to enrolment in the University.

General requirements

Subject to the general requirements laid down by the academic authorities, admission to the specialized Master's degree programme will be granted to students who fulfil the entry requirements for studies leading to the award of a Master's (second-cycle) degree and who hold a second-cycle diploma, degree, certificate or other qualification issued within or outside the French Community of Belgium, or whose prior learning or experience has been accredited by the Examination Board as being equivalent to at least 300 credits.

Specific Admission Requirements

This program is open to students :

1) On the basis of their degree : holders of the following degrees :

"Ingénieur civil" of the French-speaking community

"Burgerlijk ingenieur" of the Dutch-speaking community

"Ingénieur civil polytechnique" of l'Ecole Royale Militaire, Brussels

"Burgerlijk ingenieur polytechnicus" of the "Koninklijke Militaire School", Bruxelles

2) On the basis of a decision taken by the teaching committee (of this program) in function of an evaluation of the previous studies and experience of the candidates : candidates with another second cycle university degree or a degree from another institute of higher education of the French-speaking or Dutch-speaking communities (viz. Bio-ingénieur, Bio-ingenieur, Ingénieur civil architecte, Burgerlijk Ingenieur Architect, Licencié en Sciences, Licenciaat in Wetenschappen, Ingénieur Industriel, Industriël Ingenieur,...)

3) Candidates with a foreign higher education degree may be admitted within the limits stipulated in the Decrees (Decree of the French-speaking Community of 31 March 2004 on the definition of higher education and its integration in the European system of higher education and the refinancing of universities ; corresponding Decrees of the Dutch-speaking Community), following evaluation and approval by the Teaching Committee and respecting the regulations and procedures of the universities participating in the program.

4) Holders of the new degrees (Master ingénieur civil and Master in ingenieurswetenschappen) awarded according to the above-mentioned decrees will have the same rights as soon as these degrees have been awarded by Belgian universities.

Students may enrol in the participating university of their choice. Students' candidacies will first be submitted to the Teaching Committee of the BNEN which will then make a recommendation in function of the criteria set out above.

Accessible to adults

A significant number of the students (about half) are young engineers professionally involved in the Belgian nuclear sector. The complementary degree will give them access to positions of responsibility.

The advanced electives are in part intended as continuing training and are open to foreign participants.

To make it easier for adults to take these courses, they are given as modules. Each course runs from several days to two or three weeks according to its size (number of credits). The timetable is meticulously arranged in advance to enable students engaged in professional life to manage their time between courses and work in consultation with their employer. In addition, these students may spread their program over two years.

Supplementary classes

To enrol for this Masters, the student must have a good command of certain subjects. If this is not the case, they must add preparatory modules to their Master's programme.

● Mandatory

△ Courses not taught during 2015-2016

⊕ Periodic courses taught during 2015-2016

⊗ Optional

⊖ Periodic courses not taught during 2015-2016

■ Activity with requisites

Click on the course title to see detailed informations (objectives, methods, evaluation...)

○	Supplementary classes	N.		Credits	
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Teaching method

Access to the resources (researchers and laboratories with their major infrastructure) of the Centre d'Études Nucléaires (SCK•CEN) is indispensable to ensure the pedagogical quality of this program. The interuniversity partnership guarantees the availability of the diversity of expertises necessary, as well as the quality of the teaching staff.

The modular system of each course concentrated over a limited period from several days to three weeks facilitates the participation of students engaged in professional life as well as foreign students.

Evaluation

The evaluation methods comply with the [regulations concerning studies and exams](#). More detailed explanation of the modalities specific to each learning unit are available on their description sheets under the heading "Learning outcomes evaluation method".

The learning activities are evaluated according to the rules in force at the University (see examination regulations), viz. written and oral examinations, laboratory examinations, individual and group work, public presentations of projects, and thesis defence.

Mobility and/or Internationalisation outlook

The courses and practical work are given in English.

Since the foundation of the BNEN consortium (Belgian Nuclear higher Education Network), which has been in charge of the organisation of this program, the international dimension has been provided by student exchanges, as well as by the offer of three courses especially adapted to exchanges within the European Interuniversity Association ENEN (European Nuclear Education Network - <https://www.enen-assoc.org/>). Students have the possibility of following part of their course in another university of this association. If they have acquired 20 credits in this context, the ENEN association will award the certificate "European Master of Science in Nuclear Engineering". Some of these mobility exchanges can be financed within the Erasmus program.

Possible trainings at the end of the programme

The program is organised conjointly by six universities: UCL, ULg, ULB, KULeuven, UGent, VUB. The courses are given in rooms made available to the universities by the Study Centre for Nuclear Energy at Mol (SCK.CEN). The practical work relies on the substantial infrastructure and laboratories of the Centre. The researchers of the Centre also assist with the practical work.

Contacts

Curriculum Management

Entite de la structure IMMC

Acronyme	IMMC (sigle : IMMC)	
Dénomination	Institute of Mechanics, Materials and Civil Engineering	
Adresse	Place du Levant 2 bte L5.04.01 1348 Louvain-la-Neuve Tél 010 47 22 00 - Fax 010 47 26 92	
Site web	https://www.uclouvain.be/en-immc	
Secteur	Secteur des sciences et technologies (SST)	
Institut	Institute of Mechanics, Materials and Civil Engineering (IMMC)	
Mandats	Grégoire Winckelmans	Président
Pôles	Civil and environmental engineering (GCE) Materials and process engineering (IMAP) Mechatronics (MCTR) Applied mechanics and mathematics (MEMA) Thermodynamics and fluid mechanics (TFL)	

Academic Supervisor : [Yann BARTOSIEWICZ](#)

Jury:

Président du Jury : [Jean-Didier LEGAT](#)

Secrétaire du Jury : [Yann BARTOSIEWICZ](#)

Usefull Contacts

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