Master of Science in Civil Engineering

Megastructure Engineering with Sustainable Resources (académique)
“This unique Master’s degree offers individual tutoring and an international learning environment.”
The Master of Science in Civil Engineering educates, not only the general Civil Engineer, but also has a focus on planning and construction of megastructures with the sustainable use of resources. The theme “sustainability” is increasingly important and the well-trained modern civil engineer must be able to judge and optimise civil structures and buildings in the context of the growing shortness of construction materials and energy resources. It is this focus on both themes, megastructures and sustainability, which sets us apart from other masters of civil engineering.

This Master’s degree forms part of the Bologna process. As such, graduates can work worldwide as a civil engineer for:

- Engineering consultancies;
- Contractors;
- Dredgers;
- Governmental and railway organisations.

Ten reasons

We believe that our Master’s degree offers a unique mix of features that makes it a smart choice. Here are ten reasons for choosing this Master:

- **General Civil Engineer Education**: Most large universities offer Master’s degrees that focus on one specific civil domain only. This Master educates the generalists since they are more in demand from small and large organisations alike thanks to their total overview of large projects.

- **Megastructure Engineering**: Bachelor engineers focus more on smaller projects, this Master educates engineers who want to focus on the more complex projects.

- **Sustainable Resources**: This Master educates engineers who realise that, in the future, construction materials and energy will become scarcer.

- **Strong research unit**: Our Master’s degree is taught by staff from the Research Unit of Engineering Science, one of the largest research units at the University of Luxembourg. In the last few years this department has pursued a strategy of hiring top professors from around Europe.

- **Ties to industry**: For some applied courses the best teachers from industry are selected, both the design project and the Master thesis can be done together with a company.

- **Individual supervision and small class sizes**: We limit student intake in order to provide an optimal learning environment, the active participation of students during lectures is encouraged.

- **International and multi-cultural environment**: Both students and faculty come from many different cultural backgrounds, which makes studying civil engineering in Luxembourg so much more exciting.

- **Quality of life in Luxembourg**: In a recent survey by the Mercer Consultancy, Luxembourg was ranked 17th in terms of quality of living and the safest city among 215 capitals.

- **At the heart of Europe**: Luxembourg is a short train ride away from cities such as Paris, Brussels and Frankfurt.

- **Low cost**: There is only a € 200 tuition fee per semester for this Master’s degree.
### Programme

<table>
<thead>
<tr>
<th>SEM</th>
<th>COURSE</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Concrete Structures</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>Heavy Structures in Steel and Composite</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>Underground Structures (Advanced Soil Mechanics)</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>Thin-Walled Structures</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>Matlab Programming</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>Assessment of Finite Element Calculations</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>Life Cycle Assessment and Eco Design</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>CAD &amp; CAE</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Energy Efficiency of Buildings</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Structural Dynamics</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Sustainable Transport Systems</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Engineering Surveying</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Sustainable Water and Resources Management</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Hydraulic Structures</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Design &amp; Construction Exercise</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Managerial Accounting</td>
<td>3</td>
</tr>
</tbody>
</table>

The third semester is a semester of specialisation, in which the student can stay, but can also go to partner universities abroad (Lorraine, Liège, Brussels, Kaiserslautern).

Courses (at the University of Luxembourg):

| 3 | Advanced (Design) Project / Case Study           | 10   |
| 3 | Prestressed Concrete Structures                   | 3    |
| 3 | Architectural Steel Structures                    | 3    |
| 3 | Numerical Soil Mechanics                          | 3    |
| 3 | Presentation Skills & Scientific Writing          | 3    |
| 3 | Free Electives                                   | 7    |
| 4 | Master Project                                   | 30   |

Professional partnerships are offered in the 3rd and the 4th semester.

In the 3rd semester, the “Advanced design project” serves this concern with partnerships with industry like construction companies, consultancy companies and administrations like the railway administration, the road and bridges administration and water administration. Collaborations with these partners are already established for a long time.

The same is valid for the individual Master Thesis. Within this graduation work, it is possible to work together with professional partners in a much closer collaboration.

In the 3rd semester the students have 7 ECTS as free electives, which can be selected (partially) from any master program of the University of Luxembourg. The only restriction is that the courses must be related to the current master program. The students can also go to one of the other Universities from the Greater Region. In that case the students don’t have to pay additional fees and can also get a refund for the traveling expenses.

The students can even decide to study a total semester at another university in order to follow a particular specialisation. These universities are l’Université de Lorraine (Nancy and Metz), l’Université de Liège, the University of Brussels and Die Technische Universität Kaiserslautern.

For the master project of the 4th semester, the students select their own design or research topic. This all guarantees a lot of freedom for their individual specialisation.

“This study programme educates generalists. They are more in demand from small and large organisations alike thanks to their complete overview of large projects.”
The Research Unit in Engineering Sciences (RUES) has Civil Engineering Laboratory facilities for:

- Testing:
  - (building) construction materials of steel, concrete and composites in steel and concrete;
  - of the rheological and hardening behaviour of concrete formulations;
  - of the structural behaviour of reinforced and pre-tensioned concrete structures;
  - glass and glass structures;
  - soil behaviour;
  - building dynamics.
- Building physics regarding acoustics and thermal behaviour;
- Water treatment optimisation;
- Surveying and positioning.

Research projects are currently carried out within the Civil Engineering domain with the aspects:

- Load bearing capacity and failure behaviour of all different kinds of building construction elements to optimise economic efficiency and sustainability;
- Development of sustainable concrete formulation;
- Optimisation of building physics and thermal behaviour;
- Prediction models for ground vibrations due to pile driving;
- Increasing the energy efficiency of the urban water cycle;

The Master seeks links to these research activities in the fourth semester with the "Master Thesis".

Professor Van Baars with a PhD student working on an experiment concerning the cyclic strength of sandstones.
REQUIREMENTS FOR ADMISSION

Entry requirements

Students with a “Bachelor of Science” (Academic / University degree) in “Civil Engineering” or generally in “Engineering” with a graduation profile “Civil Engineering”

These students are directly allegeable for applying to the Master’s degree.

Students with a “Bachelor of Applied Science” (Professional / Polytechnical degree) in “Civil Engineering”

These students can apply to the Master in Civil Engineering if they have an average grade of at least 75%. These students have access after successful completion of mandatory upgrading courses (if you want more information about these courses feel free to contact us) which these students can do at the University of Luxembourg (in French and German) or similar courses somewhere else.

Students with another Bachelor’s/Master’s degree

Other students with a Bachelor degree (or even Master degree) can apply for the Master course when their level is at least the same as the students of the two groups mentioned above. The applicant will be selected “sur dossier” and mandatory bridge courses can be defined.

Bridge Courses:

- Analyse 1a & 1c (Real functions, ...) / 5 ECTS
- Algebre lineaire et applications / 5 ECTS
- Probabilites et Statistiques 1 (probability) / 2 ECTS
- Analyse 2a & 2c (Integrals, Diff. eq.) / 5 ECTS
- Compléments d’algebre lineaire / 5 ECTS
- Probabilites et statistique 2 (Statistics) / 2 ECTS
- Teschnishe Mechanik IV (Dynamics) / 4 ECTS

For more information see http://basi.uni.lu

Note:
If the number of applicants passes the 20 to 25 students, they will be selected according their academic record, motivation letter and potential reference letter.

Applicants from outside Europe, North-America or Australia/New-Zealand should proof that their bachelor is of the same level as an accredited bachelor according to the Bologna process.

APPLICATION

Start of studies & enrolment

The study programme starts each year in September.

Enrolment period for European students is from middle of January to end of July (exact dates published on our web site). Enrolment period for non-European applicants is from middle of January to end of April (exact dates published on our web site). It is recommended to apply as soon as possible due to the limited number of places.

Enrolment requires online registration, where the following documents are needed:

- ID photo;
- Copy of ID or passport;
- 1 copy (both sides) of health insurance / social security card + validity date (Non-EU students can get this in Luxembourg);
- Copy of University diploma(s) including grading (and official translation if other languages than French, German or English);
- A one page motivation letter;
- Detailed CV;
- Letters of recommendation can be added as an option;
- Only in case of doubt about the level of English of the applicant, we can ask for a B1-certificate (or TOEFL).

Questions may be addressed to:

- Regarding the enrolment procedure: the Service des Études et de la Vie Étudiante (SEVE);
- For administrative purposes (time-table, management of exams, grades, etc...), please contact the study secretary.
- For curriculum content and academia: Stefan van Baars

Enrolment fee

200 € / semester

Enrolment procedure

All information relating to the application file can be find on our web site: www.uni.lu
THE UNIVERSITY OF LUXEMBOURG

Founded in 2003, the University of Luxembourg is the first and only university of the Grand Duchy of Luxembourg. Multilingual, international and research-oriented, it is also a modern institution with a personal touch. At the University of Luxembourg, students and staff come from all over the world. You will study together with people from over 100 different countries.

THE UNIVERSITY IN FIGURES*

- 6160 students
  - 2750 international students
  - 3260 undergraduate students
  - 1180 postgraduate students (Master)
  - 1180 other students
  - 550 PhD students
- 107 nationalities (students)
- 1400 employees
- 230 professors, associate professors and senior lecturers
- 670 adjunct teaching staff
- 54 degree programmes
- 11 research units
- 3 faculties
- 2 interdisciplinary centres

SERVICE FOR STUDENTS

Student accommodation
The University provides accommodation in different areas of Luxembourg-city, Esch-sur-Alzette, Mondorf, Walferdange and NoëtreDame. The rooms at the Halls of residence are single furnished rooms with an average size of 14 m².

seve.logement@uni.lu

Sports, arts and culture
"Espace Cultures" organises and coordinates a broad range of cultural events at the university. If you are interested in cultural activities, you can join the University Choir, the University Chamber Music Ensemble, the student theatre group "Edudrame" or the dance group "Dance Cluster".

"Espace Cultures" offers guided and sightseeing tours, study trips and exhibitions. You can even get free entrance for a number of cultural events.

"Campus Art” invites you to discover your own creativity. During the art workshops, you can explore different painting techniques, experimenting with light projections or create your own art works out of clay. There are no limits to your imagination!

"Campus Sports” organises a broad range of sport activities for students: you can take fitness classes, play football, work out at the gym – aquajog or do some indoor climbing. The University of Luxembourg also has its own football team.

Language courses
Multilingual teaching is a key asset of our university. The majority of our degrees are taught in at least two languages. To help you prepare, the university offers at the start of each winter semester language courses in German, French and English.

LIFE IN LUXEMBOURG

Five reasons to study in the Grand Duchy of Luxembourg

A European crossroad
- situated between France, Belgium and Germany
- one of the European Union’s capitals
- home to a number of European Institutions

A multicultural and trilingual country
- around 537,000 inhabitants
- great population diversity with 44.5% foreigners from about 170 countries
- official languages: Luxembourgish, French, German

An attractive employment market
- an international financial centre
- a modern economy with global industrial companies and international enterprises

A great offer of culture, leisure and sports
- a variety of theatre plays in different languages, music, cinema, museums, festivals, events
- numerous outdoor sports opportunities like mountain bike trails, hiking, rock climbing, sailing, water skiing, etc. as well as indoor facilities such as aquatic centres
- many cafes, bars, clubs, pubs and discos, mainly located in the Hollerich area, the old city centre and the Rives de Clausen

Luxembourg’s tourist charm
- a picturesque historic city – UNESCO World heritage site
- “Luxembourg’s Little Switzerland”
- the Ardennes castles
- the Moselle Valley

COME AND VISIT US!

The University of Luxembourg organises each spring its annual Open Day where you can meet students and staff. You can take a campus tour or visit one of our many information sessions on our degrees which take place throughout the day.

Visit our website www.uni.lu for detailed information.

* December 2013

© University of Luxembourg
Contact
University of Luxembourg
Faculty of Science, Technology and Communication
Master of Science in Civil Engineering – Megastructure Engineering with Sustainable Resources (académique)
6, rue Richard Coudenhove-Kalergi
L-1359 Luxembourg

Marielle Mabille (study secretary)
T. + 352 / 46 66 44-5906
marielle.mabille@uni.lu

Stefan Van Baars (course director)
T. + 352 / 46 66 44-5801
stefan.vanbaars@uni.lu

For further information:
http://msce.uni.lu