

Master of science in Civil Engineering Focus Professional

The programme aims at developing general skills for civil engineering applications, including the design and structural mechanics aspects, the mastering of geomaterials, project management skills, or integrated water resources management.

To reach these objectives, the MA programme is centered on the design methodology. Acquiring the required technological skills is based on the scientific knowledge and competencies developed during the BA.

Among the main axes of the programme, an emphasis is put on the simulation tools for structures and materials, which allow modelling physical reality by state of th art models treated mathematically or computationally.

Geotechnicall and environmental aspects also require specific approaches for natural materials (soils, rocks) that have to be dealt with in any construction project.

The courses, exercises and lab sessions are complemented with many projects and a Master Thesis. Three options (three modules) are available in MA2: structures, construction and geomaterials, water resources.

Bloc 1 M-IRCNE MA-IRCN

Compulsory common courses - Fundamentals in civil engineering - Block 1

ARCH-Y400	Design of concrete structures Sven DE SUTTER (Coordinator) ⊙ 5 credits [lecture: 24h, practical work: 36h] th first term © English
ARCH-Y405	Oesign of steel structures Wim HOECKMAN (Coordinator) O 5 credits [lecture: 24h, practical work: 36h] first term English
CNST-H401	Prestressed concrete Stéphanie STAQUET (Coordinator) ③ 3 credits [lecture: 18h, practical work: 18h] ⁽¹⁾ second term ⁽²⁾ English
CNST-H406	Geotechnical engineering Alessia Cuccurullo (Coordinator) and Pierre GERARD

② 5 credits [lecture: 24h, practical work: 36h] 🛗 first term 📿 English

Compulsory common courses - Challenges in large civil engineering structures - Block 1

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CNST-H418	• Non linear modeling of materials and • 4 credits [lecture: 24h, practical work: 24h]	structures Thier [™] second term ♀	r y MASSART (Co English	ordinator)	
CNST-H420	Dynamics of structures Arnaud DER/ O 4 credits [lecture: 24h, practical work: 24h]	AEMAEKER (Coor	dinator) English		
CNST-H421	Structural analysis and finite element ② 5 credits [lecture: 36h, tutorial classes: 24h]	s │ Peter BERKE (⁽) first term ♀ E	Coordinator) and	l Lincy Pyl	
CNST-Y400	Experimental techniques for characte	rization of constr	uction materials	Dimitrios A	NGELIS (Coordinator)

Compulsory common courses - Transversal skills and industrial applications - Block 1

CNST-H422	Sustainability in construction Didier Snoeck (Coordinator) 4 credits [lecture: 24h, practical work: 24h] second term English
CNST-Y403	Digitalization in construction Rajan Dessai Filomeno Coelho (Coordinator) 4 credits [lecture: 24h, practical work: 24h] first term English
PROJ-H406	Oesign project in civil engineering Lincy Pyl (Coordinator), Youri CARLSON and Pierre GERARD O 9 credits [lecture: 8h, project: 250h]
PROJ-H407	Research Methods in Civil Engineering Arnaud DERAEMAEKER (Coordinator), Dimitrios ANGELIS and Marijke Huysmans

🕑 3 credits [lecture: 12h, personal assignments: 60h] 🛛 🗂 second term 🛛 \bigcirc English



Project management - Block 1

Project management

- One course chosen from the following			
CNST-H423 (optional)	Architecture, engineering and construction project management Philippe BOUILLARD (Coordinator) ③ 5 credits [lecture: 36h, practical work: 24h] ⁽¹⁾ second term ⁽²⁾ English		
PROJ-H417 (optional)	Projet coopération au développement Antoine NONCLERCQ (Coordinator) ③ 5 credits [project: 150h] ⁽¹⁾ first and second terms ⁽²⁾ French Only on selection : see the Development Unit of the Polytechnic School of Brussels (http://polytech.ulb.be/en/international/development-cooperation)		
PROJ-H418 (optional)	Hands-on learning: project manager (chef de projet) Peter BERKE (Coordinator) ② 5 credits [project: 150h] first and second terms		



MA-IRCN | M-IRCNE | 2023-2024

Master of science in Civil Engineering Focus Professional

Bloc 2 | M-IRCNE | MA-IRCN

Thesis - Block 2

MEMO-H501 Master thesis civil engineering Arnaud DERAEMAEKER (Coordinator) and Danny VAN HEMELRIJCK 24 credits [mfe/tfe: 600h]
academic year
English

Semi-elective blocks - Block 2

2 blocks amongst the 3 must be chosen.

Semi-elective Blocks

Choose 2 blocks out of these 3

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18 to 20 credits chosen from the following
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An alternative chosen from the three following
                   Innovative design of civil engineering structures
 CNST-H530
                    Integrated structural design Thierry MASSART (Coordinator) and Matthieu MALLIE
                    ② 6 credits [lecture: 24h, practical work: 48h] 🛛 💾 second term 🛛 ▷ English
 CNST-Y404
                    Lightweight composite structures | Eric MOUSSIAUX (Coordinator) and Tine Tysmans
                    🕑 4 credits [lecture: 24h, practical work: 24h] 🛛 🛗 first term 🛛 💭 English
or
                   Geotechnologies for sustainable developments
 CNST-H517
                    Energy geomechanics | Pierre GERARD (Coordinator)
                    🕑 5 credits [lecture: 24h, practical work: 36h] 🛛 📋 second term 🛛 🔎 English
 CNST-Y501
                    Groundwater modelling | Marijke Huysmans (Coordinator)
                    🕐 5 credits [lecture: 12h, tutorial classes: 24h, personal assignments: 24h] 🛛 📋 first term 🔗 English
                   Reliability and monitoring in civil engineering
CNST-H409
                    Robustness of Structures and Relibability of materials | Peter BERKE (Coordinator)
                    ② 4 credits [lecture: 24h, practical work: 24h] 🛛 📋 first term 🛛 ♀ English
CNST-Y405
                    Structural health monitoring, maintenance and repair Dimitrios ANGELIS (Coordinator)
                    🕑 4 credits [lecture: 24h, practical work: 24h] 🛛 📋 second term 🛛 \bigcirc French
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Elective Courses - Block 2

Select a number of credits to complete the 120 ECTS of the Master program from one or more of these packages. The individual courses of the semi-elective blocks above (other than the blocks selected by the student) can be included in the choice of electives, and are considered on equal footing with the courses in the list below.

	Choose among the following list			
16 to 18 credits c	16 to 18 credits chosen from the following			
	Electives : Structures			
ARCH-Y402 (optional)	Spatial structures : design and analysis Lars DE LAET (Coordinator) ② 4 credits [lecture: 24h, practical work: 24h] 🛗 second term 🔎 English			
CNST-Y504 (optional)	O 4 credits [lecture: 24h, practical work: 24h] Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformable structures Image: Comparison of transformation structures Image: Comparison of transformation structures Image: Comparison of transformation s			
CNST-Y507 (optional)	Steel bridges construction Wim HOECKMAN (Coordinator) 3 credits [lecture: 12h, tutorial classes: 24h] second term English 			
	Electives : Water resources			
CNST-Y402 (optional)	Surface water hydrology Jiri NOSSENT (Coordinator), Wim THIERY and Ann VAN GRIENSVEN 5 credits [lecture: 30h, tutorial classes: 30h] first term English 			
CNST-Y502 (optional)	Urban hydrology and hydraulics Solomon SEYOUM (Coordinator) Image: Solomon Seyoum (Coordinator) Image: Solomon Seyoum (Coordinator)			
CNST-Y509 (optional)	Surface water modelling Ann VAN GRIENSVEN (Coordinator) ③ 5 credits [lecture: 12h, practical work: 24h, personal assignments: 24h]			
CNST-Y510 (optional)	Water Resources Management 2 : EU and International framework Steven John EISENREICH (Coordinator) and Nora VAN CAUWENBERGH ③ 5 credits [lecture: 24h, practical work: 12h, personal assignments: 12h]			
CNST-Y520 (optional)	Land-Climate dynamics │ Wim THIERY (Coordinator) ② 5 credits [lecture: 30h, practical work: 24h] ⁽¹⁾ first term ♀ English			
	Electives : Building physics and architecture			
CNST-H306 (optional)	Bioclimatic design Ahmed Zaib KHAN MAHSUD (Coordinator) Image: Stredits [lecture: 36h, practical work: 24h] Image: Stredits [lecture: 36h, practical work: 24h]			
CNST-Y512 (optional)	Image: Second			
CNST-Y515 (optional)	O 3 credits [lecture: 12h, practical work: 24h] first term English			
	Electives : Management, economics and law			
CNST-Y511 (optional)	Human resources management ② 6 credits [lecture: 36h, tutorial classes: 4h, personal assignments: 130h] 🛗 second term 🔗 English			
GEST-Y501 (optional)	Business Management and Entrepreneurship Marc GOLDCHSTEIN (Coordinator) ② 3 credits [lecture: 33h] 🗂 first term 🔎 English			
GEST-Y502 (optional)	O 3 credits [lecture: 27h, personal assignments: 59h]			
URBA-H501 (optional)	Urban and construction law Kim MORIC (Coordinator) Image: Stredits [lecture: 24h, field trips: 12h] Image: Stredits [lecture: 24h, field trips: 12h]			
	Electives : Miscellanea			
CNST-H312 (optional)	Geology and engineering geology Pierre GERARD (Coordinator) ② 5 credits [lecture: 24h, practical work: 36h] 🛗 second term 🔎 English			

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LANG-H500 (optional)	English for professional purposes Alexander CORNFORD (Coordinator) and Matthew LANGSLEY ③ 5 credits [tutorial classes: 48h, personal assignments: 12h] ⁽¹⁾ first and second terms ⁽²⁾ English	
PROJ-H502 (optional)	Oesign project competition Philippe BOUILLARD (Coordinator) and Vincent GERIN 4 credits [seminars: 30h, project: 90h] 🛗 second term 🔎 English	
URBA-H500 (optional)	Infrastructure and Mobility Philippe BOUILLARD (Coordinator) ③ 5 credits [lecture: 24h, tutorial classes: 12h, field trips: 30h, personal assignments: 30h]	
	Electives : Internships	
STAG-H501 (optional)	Internship (60 days) Frédéric ROBERT (Coordinator) ② 10 credits [work placement: 300h] ☐ first term >> English	
STAG-H505 (optional)	Internship civil engineering (2 months) Lincy Pyl (Coordinator) and Marijke Huysmans ∅ 6 credits [work placement: 180h]	

Free elective courses

UNIVERSITÉ

Students have also the opportunity to choose courses among the courses of the 'transversal modules' of the School. English : LANG-H500 Engineering and society : PROJ-H421 - GEST-H509 - BIME-G5505 - PHYS-F517 Sustainability : GEST-S492 - ENVI-F405 - CHIM-H504 - ENVI-F452 - ENVI-F454 - ELEC-Y514

Finance, accounting, management, marketing, logistics and quality : GEST-S101 - GEST-S318 - GEST-S421 - GEST-Y501 GEST-H501 - GEST-H502

Participation to a summer school : EDUC-H601

Free elective courses

Up to six credits c	Up to six credits chosen from the following		
BIME-G5505 (optional)	Interfaculty and interdisciplinary program in Healthcare Innovation Hilde STEVENS (Coordinator) ① 5 credits [lecture: 40h, tutorial classes: 20h] 📋 second term 📿 English		
CHIM-H504 (optional)	Imagineering aspects of circular economy Prakash VENKATESAN (Coordinator) Image: Stredits [lecture: 24h, practical work: 36h] Image: Stredits		
DROI-C5174 (optional)	Approche interdisciplinaire du droit de la propriété intellectuelle/Interdisciplinary Approach to In Julien CABAY (Coordinator) ② 5 credits [lecture: 24h] 🛗 first term 🔎 English/French		
EDUC-H601 (optional)	Summer School Johan GYSELINCK (Coordinator) ② 5 credits [personal assignments: 5h] 👚 academic year 👂 English		
ELEC-Y514 (optional)	Sustainability : an interdisciplinary Approach Cathy MACHARIS (Coordinator) and Waldo Galle ② 6 credits [lecture: 36h, practical work: 24h] 👚 academic year 🔎 English		
ENVI-F405 (optional)	Climat: sciences et politiques Frank PATTYN (Coordinator) and Louise Knops ③ 5 credits [lecture: 40h] 📋 second term 🔎 French		
ENVI-F452 (optional)	Environmental impact analysis and management Wouter ACHTEN (Coordinator) ② 5 credits [lecture: 24h, practical work: 12h, project: 24h]		
ENVI-F454 (optional)	Energie: Société et environnement Michel HUART (Coordinator) and Nadine MATTIELLI ② 5 credits [lecture: 30h, practical work: 12h, project: 24h]		
GEST-H501 (optional)	Logistics Engineering and Management Alassane Ballé NDIAYE (Coordinator) ② 5 credits [lecture: 12h, tutorial classes: 36h] first term 🔎 English		
GEST-H502 (optional)	O 5 credits [lecture: 12h, tutorial classes: 36h, personal assignments: 12h] [™] = second term		

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GEST-H509 (optional)	🗂 unknown term	
GEST-S101 (optional)	Omptabilité financière Gilles GEVERS (Coordinator) and Laurent GHEERAERT O 5 credits [lecture: 36h, tutorial classes: 8h] Construire Construire <td></td>	
GEST-S318 (optional)	 Introduction to theoretical finance Laurent GHEERAERT (Coordinator) ⊙ 5 credits [lecture: 24h, tutorial classes: 24h] ⁽¹⁾ second term	
GEST-S421 (optional)	 Entrepreneurial ecosystems Judith BEHRENS (Coordinator) ⊙ 5 credits [lecture: 24h, tutorial classes: 24h] ⁽¹⁾ second term	
GEST-S492 (optional)	Energy policy, sustainability & management Adel EL Gammal (Coordinator), Julien BLONDEAU a O 5 credits [lecture: 36h, seminars: 24h] first term Figure English	nd Michel HUART
GEST-Y501 (optional)	O 3 credits [lecture: 33h]	
LANG-H500 (optional)	English for professional purposes Alexander CORNFORD (Coordinator) and Matthew LANGSLE ③ 5 credits [tutorial classes: 48h, personal assignments: 12h] ⁽¹⁾ first and second terms ⁽²⁾ English	(
PHYS-F517 (optional)	How To Make (almost) Any Experiment Using Digital Fabrication Denis TERWAGNE (Coordinato O 5 credits [lecture: 24h, practical work: 24h] first term French	r)
PROJ-H421 (optional)	Projet polydaire: expériences didactiques innovantes pour le secondaire Simon-Pierre GORZA (© 5 credits [project: 150h] 🛗 academic year 📿 French	Coordinator)