Block view of the study programme

	Or	Th	Pr	Au	Cr

Block 1

If one or several of the mandatory courses have already been credited when entering the Master of Data science program, they can be replaced by a corresponding amount of credits chosen among the elective courses.

Compulsory Courses

Code	Course	Or	Th	Pr	Au	Cr
DATS0001-1	*Foundations of data science* (english language) - Gilles LOUPPE - [60h Proj.]	Q1	30	-	[+]	5
PROJ0021-1	*Data science project* (english language) - Christophe DEBRUYNE, Maxime FAYS, Pierre GEURTS, Gilles LOUPPE - [120h Proj.] **Corequisite :** INFO0902-1 - Structures des données et algorithmes	Q2	5	-	[+]	5

Elective courses

Single focus

Professional focus in data science

Code	Course	Or	Th	Pr	Au	Cr
ELEN0062-1	*Introduction to machine learning* (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.] **Corequisite :** INFO8006-1 - Introduction to artificial intelligence	Q1	30	5	[+]	5
INFO8010-1	*Deep learning* (english language) - Gilles LOUPPE - [60h Proj.]	Q2	30	-	[+]	5
INFO9014-1	*Knowledge representation and reasoning* (english language) - Christophe DEBRUYNE - [45h Proj.]	Q2	24	20	[+]	5
INFO9016-1	*Advanced Databases* (english language) - Christophe DEBRUYNE - [20h Proj.] **Corequisite :** INFO0009-2 - Bases de données (organisation générale)	Q2	24	20	[+]	5
MATH0461-2	*Introduction to numerical optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	Q1	30	20	[+]	5
MATH2021-1	*High-dimensional statistics* (english language) - Gentiane HAESBROECK - [30h Proj.]	Q1	30	15	[+]	5

In agreement with the Jury, choose a total of 20 credits for Block 1 in the following list, among those that have not already been credited before.

Data Science foundation courses
The following courses (INFO0009-2, INFO8006-2 and INFO0902-1) are corequisite to some compulsory courses of the master program. They must be taken as a priority, unless they were already taken as part of the bachelor of science in engineering or bachelelor of computer science, or unless the corresponding knowledge and skills have been acquired previously.

Code	Course	Or	Th	Pr	Au	Cr
INFO0009-2	*Database (general organisation)* - Christophe DEBRUYNE - [25h Proj.]	Q2	26	26	[+]	5
INFO8006-1	*Introduction to artificial intelligence* (english language) - Gilles LOUPPE - [45h Proj.]	Q1	25	20	[+]	5
INFO0902-1	*Data structures and algorithms* - Pierre GEURTS - [40h Proj.]	Q2	26	20	[+]	5
ELEN0016-2	*Computer vision* (english language) - Marc VAN DROOGENBROECK - [50h Proj.]	Q1	30	10	[+]	5
ELEN0060-2	*Information and coding theory* (english language) - Louis WEHENKEL - [30h Proj.]	Q2	30	15	[+]	5
INFO0016-1	*Introduction to the theory of computation* (english language) - Quentin LOUVEAUX	Q1	26	26	-	5
INFO0027-2	*Programming techniques* (english language) - *Algorithmics* - Laurent MATHY - [40h Proj.]	Q2	14	14	[+]	5

Code	Course					Credits
	- Software patterns - Laurent MATHY - [30h Proj.]		10	10	[+]	
INFO0054-1	*Functional programming* - Christophe DEBRUYNE - [20h Proj.]	Q1	24	24	[+]	5
INFO0939-1	*High performance scientific computing* (english language) - Christophe GEUZAINE - [20h Proj.]	Q1	30	15	[+]	5
INFO0948-2	*Introduction to intelligent robotics* (english language) - Pierre SACRÉ - [80h Proj.]	Q2	30	4	[+]	5
INFO2049-1	*Web and Text Analytics* (english language) - Ashwin ITTOO	Q1	30	-	-	5
INFO8003-1	*Optimal decision making for complex problems* (english language) - Damien ERNST - [45h Proj.]	Q2	25	10	[+]	5
INFO8004-1	*Advanced Machine learning* (english language) - Pierre GEURTS, Gilles LOUPPE, Louis WEHENKEL - [20h Proj.]	Q2	25	-	[+]	5
INFO9012-1	*Parallel Programming* (english language) - Pascal FONTAINE	Q2	25	25	-	5
INFO9015-1	*Logic for Computer Science* (english language) - Pascal FONTAINE	Q1	24	20	-	5
MATH0462-1	*Discrete optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	Q2	30	20	[+]	5
MATH2022-1	*Monte Carlo methods in statistics* (english language) - Arnout VAN MESSEM - [40h Proj.]	Q2	24	12	[+]	5
MQGE0002-3	*Computational Optimization* (english language) - Bernard FORTZ	Q2	30	-	-	5
BIOL0021-1	*Biology of the systems* - Patrick MEYER - [10h Mon. WS] **Corequisite :** OCEA0089-1 - Introduction to marine ecosystems modelling	Q1	10	-	[+]	2
OCEA0089-1	*Introduction to marine ecosystems modelling* (english language) - Marilaure GRÉGOIRE **Corequisite :** BIOL0021-1 - Biologie des systèmes	Q1	15	15	-	3
GEOG0057-1	*Spatial analysis* - François JONARD	Q2	30	30	-	5
GEOG0059-1	*Infrastructures of spatial data* - Roland BILLEN, JeanPaul KASPRZYK	Q1	30	30	-	5
GEST0832-4	*Financial Markets* - Georges HÜBNER	Q2	40	15	-	5
FINA0063-1	*Advanced Statistical Methods in Finance* (english language) - Julien HAMBUCKERS	Q1	30	-	-	5
GEST3032-1	*eBusiness and eCommerce* (english language) - Ashwin ITTOO	Q1	30	-	-	5
GBIO0002-1	*Genetics and bioinformatics* (english language) - Franck DEQUIEDT, Kristel VAN STEEN - [15h Proj.]	Q1	30	15	[+]	5
GBIO0009-1	*Topics in bioinformatics* (english language) - Kristel VAN STEEN - [35h Proj.]	Q1	25	15	[+]	5
GBIO0030-1	*Computational approaches to statistical generics* (english language) - Kristel VAN STEEN - [35h Proj.]	Q2	25	15	[+]	5
SPAT0263-1	*Machine Learning in Space Sciences* (english language) - Maxime FAYS	Q1	30	15	-	5
SPAT0264-1	*Machine Learning for Gravitational-wave Astronomy* (english language) - Maxime FAYS	Q2	10	20	-	5
INFO9023-1	*Machine Learning Systems Design* (english language) - Thomas VRANCKEN - [17h Labo., 18h Proj.] **Corequisite :** ELEN0062-1 - Introduction to machine learning	Q2	17	-	[+]	5

[...] With the agreement of the President of the Jury, students may also choose up to 15 credits in the application area of their Master thesis in other programmes of the university

[...] With the agreement of the President of the Jury, students may also choose 5 credits in any other programme of the university or from the UNIC course catalog

Block 2

Compulsory Courses

Code	Course					
DROI1357-1	*European law, (big) data and artificial intelligence applications seminar* (english language) - - Suppl : Ljupcho GROZDANOVSKI	Q1	24	-	-	**5**
GEST3162-1	*Principles of management* (english language) - François PICHAULT, Willem STANDAERT - [25h Proj.]	Q1	30	-	[+]	**5**
ATFE9009-1	*Master thesis* (english language) - Pierre GEURTS - [750h Proj.]	TA	-	-	[+]	**25**

[...] Students who have already acquired the skills and knowledge of GEST3162 (or equivalent) will replace it by a course of their choice of 5 ECTS

Elective courses

In agreement with the Jury, choose a total of 25 credits for Block 2 in the following list, among those that have not already been credited before.

Data Science foundation courses
The following courses (INFO0009-2, INFO8006-2 and INFO0902-1) are corequisite to some compulsory courses of the master program. They must be taken as a priority, unless they were already taken as part of the bachelor of science in engineering or bachelelor of computer science, or unless the corresponding knowledge and skills have been acquired previously.

Code	Course					
ELEN0016-2	*Computer vision* (english language) - Marc VAN DROOGENBROECK - [50h Proj.]	Q1	30	10	[+]	**5**
ELEN0060-2	*Information and coding theory* (english language) - Louis WEHENKEL - [30h Proj.]	Q2	30	15	[+]	**5**
INFO0016-1	*Introduction to the theory of computation* (english language) - Quentin LOUVEAUX	Q1	26	26	-	**5**
INFO0027-2	*Programming techniques* (english language) - *Algorithmics* - Laurent MATHY - [40h Proj.] - *Software patterns* - Laurent MATHY - [30h Proj.]	Q2	 14 10	 14 10	 [+] [+]	**5**
INFO0054-1	*Functional programming* - Christophe DEBRUYNE - [20h Proj.]	Q1	24	24	[+]	**5**
INFO0939-1	*High performance scientific computing* (english language) - Christophe GEUZAINE - [20h Proj.]	Q1	30	15	[+]	**5**
INFO0948-2	*Introduction to intelligent robotics* (english language) - Pierre SACRÉ - [80h Proj.]	Q2	30	4	[+]	**5**
INFO2049-1	*Web and Text Analytics* (english language) - Ashwin ITTOO	Q1	30	-	-	**5**
INFO8003-1	*Optimal decision making for complex problems* (english language) - Damien ERNST - [45h Proj.]	Q2	25	10	[+]	**5**
INFO8004-1	*Advanced Machine learning* (english language) - Pierre GEURTS, Gilles LOUPPE, Louis WEHENKEL - [20h Proj.]	Q2	25	-	[+]	**5**
INFO9012-1	*Parallel Programming* (english language) - Pascal FONTAINE	Q2	25	25	-	**5**
INFO9015-1	*Logic for Computer Science* (english language) - Pascal FONTAINE	Q1	24	20	-	**5**
MATH0462-1	*Discrete optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	Q2	30	20	[+]	**5**
MATH2022-1	*Monte Carlo methods in statistics* (english language) - Arnout VAN MESSEM - [40h Proj.]	Q2	24	12	[+]	**5**
MQGE0002-3	*Computational Optimization* (english language) - Bernard FORTZ	Q2	30	-	-	**5**
BIOL0021-1	*Biology of the systems* - Patrick MEYER - [10h Mon. WS] **Corequisite :** OCEA0089-1 - Introduction to marine ecosystems modelling	Q1	10	-	[+]	**2**
OCEA0089-1	*Introduction to marine ecosystems modelling* (english language) -	Q1	15	15	-	**3**

Marilaure GRÉGOIRE
Corequisite :
BIOL0021-1 - Biologie des systèmes

GEOG0057-1	*Spatial analysis* - François JONARD	Q2	30	30	-	**5**
GEOG0059-1	*Infrastructures of spatial data* - Roland BILLEN, JeanPaul KASPRZYK	Q1	30	30	-	**5**
GEST0832-4	*Financial Markets* - Georges HÜBNER	Q2	40	15	-	**5**
FINA0063-1	*Advanced Statistical Methods in Finance* (english language) - Julien HAMBUCKERS	Q1	30	-	-	**5**
GEST3032-1	*eBusiness and eCommerce* (english language) - Ashwin ITTOO	Q1	30	-	-	**5**
GBIO0002-1	*Genetics and bioinformatics* (english language) - Franck DEQUIEDT, Kristel VAN STEEN - [15h Proj.]	Q1	30	15	[+]	**5**
GBIO0009-1	*Topics in bioinformatics* (english language) - Kristel VAN STEEN - [35h Proj.]	Q1	25	15	[+]	**5**
GBIO0030-1	*Computational approaches to statistical generics* (english language) - Kristel VAN STEEN - [35h Proj.]	Q2	25	15	[+]	**5**
SPAT0263-1	*Machine Learning in Space Sciences* (english language) - Maxime FAYS	Q1	30	15	-	**5**
SPAT0264-1	*Machine Learning for Gravitational-wave Astronomy* (english language) - Maxime FAYS	Q2	10	20	-	**5**
INFO9023-1	*Machine Learning Systems Design* (english language) - Thomas VRANCKEN - [17h Labo., 18h Proj.]	Q2	17	-	[+]	**5**

Corequisite :
ELEN0062-1 - Introduction to machine learning

Optional company internships

Notice : the course units ASTG9008-1 and ASTG9009-1 are mutually exclusive

ASTG9008-1	*Internship (coupled with Master thesis)* (english language) - Pierre GEURTS - [80d FW]	TA	-	-	[+]	**5**
ASTG9009-1	*Internship (independent of Master thesis)* - Pierre GEURTS - [40d FW]	TA	-	-	[+]	**10**

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[...] With the agreement of the President of the Jury, students may also choose 5 credits in any other programme of the university or from the UNIC course catalog

Bloc d'aménagement du programme de l'année

Additional credits Master in Data Science Engineering (120 ECTS)

Students who are admitted to this master without having acquired equivalent courses must add them to the programme of their first year.

1. Basic courses of a bachelor degree of science in engineering, including courses equivalent to :

MATH0002-4	*Mathematical analysis 1, Part 1* - Eric DELHEZ	Q1	22	22	-	**5**
MATH0013-1	*Algebra* - Eric DELHEZ	Q1	26	26	-	**4**
MATH0062-1	*Elements of probability calculus* - Pierre SACRÉ - [25h Proj.]	Q2	15	10	[+]	**3**
MATH0487-2	*Elements of statistics* - Pierre SACRÉ - [25h Proj.]	Q1	15	10	[+]	**3**
MATH0488-1	*Elements of stochastic processes* - Maarten ARNST, Vincent DENOËL, Pierre GEURTS - [30h Proj.]	Q2	10	10	[+]	**2**
INFO2009-2	*Introduction to computer science* - Bernard BOIGELOT	Q1	24	14	-	**4**

MATH0006-3	*Introduction to numerical analysis* (english language) - Quentin LOUVEAUX	Q1	20	20	-	**4**
MECA0003-2	*Rational Mechanics* - Eric DELHEZ	Q1	20	30	-	**4**
SYST0002-2	*Introduction to signals and systems* - Guillaume DRION - [15h Proj.]	Q1	26	26	[+]	**5**

2. Additional courses in computer science :

INFO0902-1	*Data structures and algorithms* - Pierre GEURTS - [40h Proj.]	Q2	26	20	[+]	**5**
INFO0009-2	*Database (general organisation)* - Christophe DEBRUYNE - [25h Proj.]	Q2	26	26	[+]	**5**
INFO8006-1	*Introduction to artificial intelligence* (english language) - Gilles LOUPPE - [45h Proj.]	Q1	25	20	[+]	**5**

3. A level B2 in English