Cycle view of the study programme

		Bl	Or	Th	Pr	Au	Cr

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 from the core curriculum (B1 : 5Cr, B2 : 35Cr)

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 MATH0461-2 - Introduction to numerical optimization	B1	Q2	5	-	[+]	**5**
DROI1357-1	*European law, (big) data and artificial intelligence applications seminar* (english language) - Jérôme DE COOMAN, Ljupcho GROZDANOVSKI	B2	Q1	24	-	-	**5**
GEST3162-1	*Principles of management* (english language) - Michaël PARMENTIER, Willem STANDAERT - [25h Proj.]	B2	Q1	30	-	[+]	**5**
ATFE9009-1	*Master thesis* (english language) - Christophe DEBRUYNE - [750h Proj.]	B2	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						

Optional courses from the core curriculum (B1 : 25Cr, B2 : 25Cr)

In agreement with the Jury, choose a total of 25 credits for Block 1 and 25 credits for Block 2 in the following list, among those that have not already been credited before. (B1 : 25Cr, B2 : 25Cr)

Data Science foundation courses
The following courses (INFO0009-2, INFO8006-1, MATH0461-2 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.

INFO8006-1	*Introduction to artificial intelligence* (english language) - Gilles LOUPPE - [45h Proj.]	B1	Q1	25	20	[+]	**5**
MATH0461-2	*Introduction to numerical optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	B1	Q1	30	20	[+]	**5**
INFO0009-2	*Database (general organisation)* - Christophe DEBRUYNE - [25h Proj.]	B1	Q2	26	26	[+]	**5**
INFO0902-1	*Data structures and algorithms* - Pierre GEURTS - [40h Proj.]	B1	Q2	26	20	[+]	**5**
DATS0002-1	*Data visualization* (english language) - Adrien DELIÈGE - [25h Proj.]	-	Q2	25	20	[+]	**5**
ELEN0016-2	*Computer vision* (english language) - Anthony CIOPPA, Adrien DELIÈGE, 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**
ELEN0449-1	*Computer Vision understanding* (english language) - Anthony CIOPPA - [50h Proj.]	-	Q2	24	10	[+]	**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**
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	*Artificial Intelligence Methods for Natural Language Processing*	-	Q1	30	-	-	**5**

	(english language) - Ashwin ITTOO						
INFO8003-1	*Reinforcement learning* (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**
INFO9015-1	*Logic for Computer Science* (english language) - Pascal FONTAINE	-	Q1	24	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**
INFO9030-1	*Explainable Artificial Intelligence* (english language) - Vân Anh HUYNHTHU - [50h Proj.] **Corequisite :** ELEN0062-1 - Introduction to machine learning	-	Q2	24	-	[+]	**5**
MATH0462-1	*Discrete optimization* (english language) - Quentin LOUVEAUX - [25h Proj.]	-	Q2	30	20	[+]	**5**
MATH1222-3	*Introduction to stochastic processes* - Céline ESSER, Pierre GEURTS - [10h Mon. WS]	-	Q2	20	10	[+]	**5**
MATH2022-1	*Monte Carlo methods in statistics* (english language) - Arnout VAN MESSEM - [40h Proj.] (Even years)	-	Q2	24	12	[+]	**5**
MQGE9007-1	*Advanced Modeling Techniques in Optimization* (english language) - Quentin LOUVEAUX, N...	-	Q1	30	-	-	**5**
SYST0022-1	*Linear Systems Design* (english language) - Guillaume DRION, Pierre SACRÉ - [15h Proj.]	-	Q2	26	26	[+]	**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, JeanPaul KASPRZYK	-	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	*e-Commerce Methods and Techniques* (english language) - Ashwin ITTOO	-	Q1	30	-	-	**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**

Optional company internship

ASTG9009-1	*Internship (independent of Master thesis)* - Christophe DEBRUYNE - [40d FW]	B2	TA	-	-	[+]	**10**

[...] 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

Focus courses (B1 : 30Cr)

DATS0001-1	*Foundations of data science* (english language) - Gilles LOUPPE - [60h Proj.]	B1	Q1	30	-	[+]	**5**
ELEN0062-1	*Introduction to machine learning* (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.] **Corequisite :** INFO8006-1 - Introduction to artificial intelligence	B1	Q1	30	5	[+]	**5**
INFO9016-1	*Advanced Databases* (english language) - Christophe DEBRUYNE - [20h Proj.] **Corequisite :** INFO0009-2 - Bases de données (organisation générale)	B1	Q1	24	20	[+]	**5**
MATH2021-1	*High-dimensional statistics* (english language) - Gentiane HAESBROECK - [30h Proj.]	B1	Q1	30	15	[+]	**5**
INFO8010-1	*Deep learning* (english language) - Gilles LOUPPE - [60h Proj.]	B1	Q2	30	-	[+]	**5**
INFO9014-1	*Knowledge representation and reasoning* (english language) - Christophe DEBRUYNE - [45h Proj.]	B1	Q2	24	20	[+]	**5**

Bridging courses Master in Data Science

Optional courses (B0 : 60Cr)

Each student's program will be determined by the jury based on their previous education. If an applicant does not meet certain prerequisites, their program will include up to 60 additional course credits, mainly from the list below. (B0 : 60Cr)

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

MATH2007-1	*General mathematics I* - Françoise BASTIN	B0	Q1	30	40	-	**6**
MATH0499-1	*Graph theory* - Michel RIGO	B0	Q1	25	20	-	**4**
MATH0495-1	*Elements for calculating probabilities* - *Part 1: Analysis tools for probabilities* - Laurent LOOSVELDT - *Part 2: Probability theory* - Laurent LOOSVELDT	B0	Q1 6 20	 6 20	 - -		**3**
MATH0487-2	*Elements of statistics* - Pierre SACRÉ - [25h Proj.]	B0	Q1	15	10	[+]	**3**
MATH1222-3	*Introduction to stochastic processes* - Céline ESSER, Pierre GEURTS - [10h Mon. WS]	B0	Q2	20	10	[+]	**5**
INFO0902-1	*Data structures and algorithms* - Pierre GEURTS - [40h Proj.]	B0	Q2	26	20	[+]	**5**
INFO0009-2	*Database (general organisation)* - Christophe DEBRUYNE - [25h Proj.]	B0	Q2	26	26	[+]	**5**
MATH0006-3	*Introduction to numerical analysis* (english language) - Quentin LOUVEAUX	B0	Q1	20	20	-	**4**
INFO0062-1	*Object-oriented programming* (english language) - Bernard BOIGELOT - [20h Proj.]	B0	Q2	25	20	[+]	**5**
MATH2019-1	*Mathematics for computing 1* - Emilie CHARLIER	B0	Q1	26	26	-	**5**
MATH2020-1	*Mathematics for computing 2* - Emilie CHARLIER	B0	Q1	26	26	-	**5**
INFO8006-1	*Introduction to artificial intelligence* (english language) - Gilles LOUPPE - [45h Proj.]	B0	Q1	25	20	[+]	**5**

2. A level B2 in English