

Curriculum Master Computing Science 2016-2017 (draft version 15-02-16, subject to change!)

Each Master specialization consists of **95 ECTS compulsory courses** (see Tables 1–3) and **25 ECTS choice courses**:

- 15 ECTS can be chosen freely from any Master courses taught at the University
- 10 ECTS are guided choice courses, which means that two courses from the list of guided choice courses belonging to the Master specialization have to be chosen (see Tables 4–6)

Please note that a few master courses will not be taught each year, but **in alternating years**, and in addition some new courses will only start in the year 2017-2018 (see Table 8, also indicated between brackets behind the course names in the other tables). Make sure that you take this into account when you make your two-year planning for all the courses that have to be completed.

In Tables 1–3, courses printed in bold are obligatory in all three specializations.

Table 1: Master specialization: **Intelligent Systems and Visual Computing**

Year	Semester	Course	Course code	ECTS
1	Ia	Web and Cloud Computing	INMWCC-12	5
1	Ia	Pattern Recognition	INMPR-08	5
1	Ia	Free or guided choice course		5
1	Ib	Introduction to Data Science	WMCS16002	5
1	Ib	Image Processing	INMIP-08	5
1	Ib	Neural Networks and Computational Intelligence	WMCS15001	5
1	IIa	Student colloquium CS	INMCOL-08	5
1	IIa	Scientific Visualization	INMSV-08	5
1	IIa	Computer Vision	INMCV-08	5
1	IIb	In-company or Research Internship (CS)	INSTAGE15	15
2	Ia	Data Science and Visual Analytics (17/18)	WMCS16000	5
2	Ia	Free or guided choice course		5
2	Ia	Free or guided choice course		5
2	Ib	Free or guided choice course		5
2	Ib	Advanced Computer Graphics	INMACG-08	5
2	Ib	Free or guided choice course		5
2	IIa and IIb	Master Thesis	INMAFST-08	30

Table 2: Master specialization: **Software Engineering and Distributed Systems**

Year	Semester	Course	Course code	ECTS
1	Ia	Web and Cloud Computing	INMWCC-12	5
1	Ia	Software Architecture	INMSA-08	5
1	Ia	Software Maintenance & Evolution	INMSME-08	5
1	Ib	Introduction to Data Science	WMCS16002	5
1	Ib	Software Patterns	INMSP-08	5
1	Ib	Free or guided choice course		5
1	IIa	Student colloquium CS	INMCOL-08	5
1	IIa	Formal Modeling of Communicating Systems	WMCS14001	5
1	IIa	Scalable Computing	WMCS16003	5
1	IIb	In-company or Research Internship (CS)	INSTAGE15	15
2	Ia	Distributed Systems	INMDSY-08	5
2	Ia	Free or guided choice course		5
2	Ia	Free or guided choice course		5
2	Ib	Information Systems (17/18)	WMCS16001	5
2	Ib	Free or guided choice course		5
2	Ib	Free or guided choice course		5
2	IIa and IIb	Master Thesis	INMAFST-08	30

Table 3: Master specialization: **Data Science and Systems Complexity**

Year	Semester	Course	Course code	ECTS
1	Ia	Web and Cloud Computing	INMWCC-12	5
1	Ia	Pattern Recognition	INMPR-08	5
1	Ia	Modelling & Simulation	INMMS-08	5
1	Ib	Introduction to Data Science	WMCS16002	5
1	Ib	Free or guided choice course		5
1	Ib	Neural Networks and Computational Intelligence	WMCS15001	5
1	IIa	Student colloquium CS	INMCOL-08	5
1	IIa	Scientific Visualisation	INMSV-08	5
1	IIa	Scalable Computing	WMCS16003	5
1	IIb	In-company or Research Internship (CS)	INSTAGE15	15
2	Ia	Data Science and Visual Analytics (17/18)	WMCS16000	5
2	Ia	Free or guided choice course		5
2	Ia	Free or guided choice course		5
2	Ib	Free or guided choice course		5
2	Ib	Information Systems (17/18)	WMCS16001	5
2	Ib	Free or guided choice course		5
2	IIa and IIb	Master Thesis	INMAFST-08	30

Table 4: Guided choice courses **Intelligent Systems and Visual Computing**

Semester	Course	Course code	ECTS
Ia	Modelling & Simulation	INMMS-08	5
Ia	Robotics for IEM*	TBROB-12	5
Ia	Computational Physics	NACP-11	5
Ib	Computational Semantics	LIX021M05	5
Ib	Cognitive Modeling: basic principles and methods	KIM.CMB11	5
Ib	Statistical Signal Processing (MSc)	STMASP-12	5
Ib	Dynamic Logic (16/17)	INMDL-08	5
Ib	Ubiquitous Computing (17/18)	INMUBC-09	5
Ib	Machine Learning	KIM.ML09	5
Ib	Adv. self-organisation of social systems	MLBI0801	5
IIa	Scalable Computing	WMCS16003	5
IIa	Formal Modeling of Communicating Systems	WMCS14001	5
IIa	Natural Language Processing	LIX001M05	5
IIa	Multi-Agent Systems	KIM.MAS03	5
IIa	Numerical Mathematics 2	WINM2-08	5
IIb	Numerical Mathematics 1	WINM1-07	5
IIb	Handwriting Recognition	KIM.SCHR03	5

*Requires prior physics knowledge

Table 5: Guided choice courses **Software Engineering and Distributed Systems**

Semester	Course	Course code	ECTS
Ia	Pattern Recognition	INMPR-08	5
Ia	Robotics for IEM*	TBROB-12	5
Ib	Machine Learning	KIM.ML09	5
Ib	Advanced Software Architecture	INMASA-10	5
Ib	Ubiquitous Computing (17/18)	INMUBC-09	5
IIa	Scientific Visualisation	INMSV-08	5
IIa	Multi-Agent Systems	KIM.MAS03	5
IIb	Systems Engineering	TBSE05E	5

*Requires prior physics knowledge

Table 6: Guided choice courses **Data Science and Systems Complexity**

Semester	Course	Course code	ECTS
Ia	Software Maintenance & Evolution	INMSME-08	5
Ia	Robotics for IEM*	TBROB-12	5
Ib	Image Processing	INMIP-08	5
Ib	Machine Learning	KIM.ML09	5
Ib	Neural Networks and Computational Intelligence	WMCS15001	5
Ib	Statistical Signal Processing (MSc)	STMASP-12	5
Ib	Learning from Data	LIX016M05	5
Ib	Adv. self-organisation of social systems	MLBI0801	5
Ib	Contemporary Statistics with Applications (16/17)**	WICSA-10	5
Ib	Statistical genomics (17/18)**	WISG-09	5
Ib	Ubiquitous Computing (17/18)	INMUBC-09	5
Ib	Adv. self-organisation of social systems	MLBI0801	5
IIa	Natural Language Processing	LIX001M05	5
IIb	Systems Engineering	TBSE05E	5

*Requires prior physics knowledge

**Requires prior mathematical knowledge that is not covered by the Bachelor CS programme in Groningen

Table 7: Optional free choice course provided by Computing Science

Semester	Course	Course code	ECTS
IIa	Computer Ethics	WMCS13001	5

Table 8: Courses taught **in alternating years** (biennial courses), and new courses that will start in the year 2017-2018

<i>Biennial/new course</i>	<i>Course name</i>	<i>Taught in 2016-2017</i>	<i>Taught in 2017-2018</i>	<i>Taught in 2018-2019</i>
biennial	Ubiquitous Computing	NO	YES	NO
biennial	Dynamic Logic	YES	NO	YES
biennial	Contemporary Statistics with Applications	YES	NO	YES
biennial	Statistical genomics	NO	YES	NO
new	Data Science and Visual Analytics	NO	YES	YES
new	Information Systems	NO	YES	YES