

## Block view of the study programme

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### Block 1

#### Optional courses

Choisir, en accord avec le Jury, des cours pour un total de 60 crédits dans les listes proposées ci-dessous, dont au moins un des deux premiers cours de chaque liste :

#### Space sciences : interdisciplinary courses

SPAT0017-1	<i>Seminars on topical issues</i> (english language) - Aida ALVERA AZCARATE, Christian BARBIER, JeanRené CUDELL, Benoît HUBERT, Damien HUTSEMEKERS	TA	-	30	-	3
SPAT0035-1	<i>Space exploration</i> (english language) - Grégor RAUW	Q1	30	10	-	4
SPAT0001-1	<i>Plasma physics</i> (english language) - Benoît HUBERT	Q2	25	5	-	3
SPAT0018-1	<i>Ideas evolution in astronomy</i> - Yaël NAZÉ	Q1	14	6	-	2
SPAT0036-1	<i>Celestial mechanics and space trajectories</i> (english language) - Grégor RAUW	Q1	20	10	-	3
SPAT0039-1	<i>Spectroscopy in astrophysics and geophysics</i> (english language) - Jérôme LOICQ	Q1	20	10	-	3
SPAT0040-1	<i>Fluid mechanics</i> (english language) - Pierre DAUBY	Q1	20	10	-	3
SPAT0071-1	<i>Introduction to quantum field theory</i> (english language) - Atri BHATTACHARYA, JeanRené CUDELL	Q1	20	10	-	3

#### Cosmology and astroparticle

SPAT0021-1	<i>Introduction to astroparticles</i> (english language) - JeanRené CUDELL	Q2	20	10	-	3
SPAT0012-1	<i>General relativity, Part 1: Introduction</i> - Yves DE ROP	Q1	20	-	-	2
SPAT0010-1	<i>Theoretical physical cosmology</i> (english language) - Christian BARBIER, Michel TYTGAT <b>Corequisite :</b> SPAT0012-1 - Relativité générale SPAT0021-1 - Introduction to astroparticles	Q2	40	-	-	4
SPAT0012-2	<i>General relativity, Part 2: Mathematics methods</i> - Yves DE ROP <b>Corequisite :</b> SPAT0012-1 - Relativité générale	Q1	20	-	-	2
SPAT0012-3	<i>General relativity, Part 3: supplement</i> - Yves DE ROP <b>Corequisite :</b> SPAT0012-2 - Relativité générale	Q2	20	-	-	2
SPAT0019-1	<i>Special relativity</i> (english language) - JeanRené CUDELL	Q1	15	-	-	2
SPAT0160-1	<i>Particles ans astroparticles</i> (english language) - JeanRené CUDELL <b>Corequisite :</b> SPAT0162-1 - Quantum field theory	Q1	20	10	-	4
SPAT0260-1	<i>Particles and gravitation</i> (english language) - JeanRené CUDELL <b>Corequisite :</b> SPAT0012-2 - Relativité générale SPAT0012-1 - Relativité générale SPAT0162-1 - Quantum field theory	Q2	10	5	-	2
SPAT0162-1	<i>Quantum field theory</i> (english language) - JeanRené CUDELL <b>Corequisite :</b> SPAT0019-1 - Special relativity	Q2	20	10	-	4
PHYS2012-1	<i>Relativistic quantum mechanics and relativistic statistics</i> - Peter SCHLAGHECK	Q1	20	5	-	3

#### Astrophysics

SPAT0033-1	<i>Astrophysics</i> (english language) - Pierre MAGAIN	Q1	35	15	-	<b>5</b>
SPAT0044-1	<i>Stellar structure and evolution I</i> (english language) - MarcAntoine DUPRET	Q1	20	20	-	<b>3</b>
SPAT0005-1	<i>Stellar stability and asteroseismology</i> (english language) - MarcAntoine DUPRET <b>Corequisite :</b> SPAT0040-1 - Fluid mechanics SPAT0044-1 - Stellar structure and evolution I	Q2	30	10	-	<b>4</b>
SPAT0006-1	<i>Stellar atmospheres</i> (english language) - Grégor RAUW <b>Corequisite :</b> SPAT0039-1 - Spectroscopy in astrophysics and geophysics	Q2	20	10	-	<b>3</b>
SPAT0007-2	<i>Variable stars</i> (english language) - Grégor RAUW	Q1	20	10	-	<b>3</b>
SPAT0008-1	<i>Interstellar medium</i> (english language) - Damien HUTSEMEKERS, Yaël NAZÉ	Q1	20	10	-	<b>3</b>
SPAT0009-1	<i>High-energy astrophysics</i> (english language) - Grégor RAUW	Q1	25	5	-	<b>3</b>
SPAT0011-1	<i>Extragalactic astrophysics</i> (english language) - Pierre MAGAIN <b>Corequisite :</b> SPAT0033-1 - Astrophysics	Q2	20	10	-	<b>3</b>
SPAT0020-2	<i>Astrochemistry</i> (english language) - Michaël DE BECKER	Q1	30	10	-	<b>4</b>
SPAT0045-1	<i>Stellar structure and evolution II</i> (english language) - MarcAntoine DUPRET <b>Corequisite :</b> SPAT0044-1 - Stellar structure and evolution I	Q2	20	20	-	<b>3</b>
SPAT0064-1	<i>Solar physics, activity phenomena and Sun-Earth relations</i> (english language) - Frédéric CLETTE <b>Corequisite :</b> SPAT0044-1 - Stellar structure and evolution I SPAT0039-1 - Spectroscopy in astrophysics and geophysics	Q2	20	10	-	<b>3</b>
SPAT0069-1	<i>Radio astrophysics</i> (english language) - Michaël DE BECKER	Q2	15	10	-	<b>3</b>
<b>Planetary science and planetary systems</b>						
SPAT0055-1	<i>Atmosphere of the Earth</i> (english language) - Denis GRODENT	Q1	45	-	-	<b>5</b>
SPAT0063-1	<i>Introduction to exoplanetology</i> (english language) - Michaël GILLON <b>Corequisite :</b> SPAT0033-1 - Astrophysics	Q2	20	5	-	<b>3</b>
SPAT0023-1	<i>Terrestrial magnetosphere and polar lights</i> (english language) - Benoît HUBERT	Q2	30	10	-	<b>4</b>
SPAT0028-2	<i>Planetary magnetospheres and aurorae</i> (english language) - Denis GRODENT	Q2	20	10	-	<b>3</b>
SPAT0029-1	<i>Space environment</i> (english language) - Denis GRODENT	Q1	15	15	-	<b>3</b>
SPAT0043-1	<i>The small bodies of the solar system</i> (english language) - Emmanuel JEHIN	Q2	15	5	-	<b>2</b>
SPAT0056-1	<i>Planetary and exoplanetary atmospheres</i> (english language) - Denis GRODENT <b>Corequisite :</b> SPAT0055-1 - Atmosphere of the Earth	Q2	30	15	-	<b>5</b>
GEOL0263-1	<i>Astrobiology</i> - Vincianne DEBAILLE, Véronique DEHANT, Emmanuelle JAVAUX, Yaël NAZÉ, Annick WILMOTTE (Even years)	Q2	30	15	-	<b>5</b>
GEOL0304-1	<i>Introduction to neotectonics, seismology and physical volcanology</i> (english language) - Clara BRERETON, HansBalder HAVENITH - [2d FW]	Q1	25	15	[+]	<b>5</b>
SPAT0066-1	<i>Internal geophysics of the Earth and terrestrial bodies of the solar system</i> (english language) - Véronique DEHANT	Q1	25	-	-	<b>3</b>

#### Climate, environment and oceanography

SPAT0027-3	<i>Climate change and impacts</i> (english language) - Louis FRANÇOIS, Guy MUNHOVEN	TA	15	45	-	<b>5</b>
OCEA0071-1	<i>Geophysical fluid dynamics - part 1</i> (english language) - JeanMarie BECKERS	Q2	30	15	-	<b>5</b>
SPAT0024-2	<i>Meteorology</i> - Louis FRANÇOIS	Q1	40	20	-	<b>6</b>
SPAT0025-1	<i>Environmental modelling</i> (english language) - Louis FRANÇOIS, Guy MUNHOVEN	Q2	20	10	-	<b>4</b>
SPAT0026-1	<i>Paleoenvironment and evolution of the Earth system</i> (english language) - Louis FRANÇOIS	Q2	30	10	-	<b>4</b>
SPAT0032-2	<i>Remote sensing</i> (english language) - Christian BARBIER	Q1	30	30	-	<b>6</b>
SPAT0058-1	<i>Observing Earth from space</i> (english language) - Christian BARBIER	Q1	15	-	-	<b>2</b>
GEOG0037-1	<i>Global Navigation Satellite Systems</i> (english language) - René WARNANT	Q1	40	15	-	<b>5</b>
GEOG0038-1	<i>Advanced GNSS</i> (english language) - René WARNANT <b>Corequisite :</b> GEOG0037-1 - Global Navigation Satellite Systems	Q1	20	-	-	<b>2</b>
OCEA0045-1	<i>Statistical methods of analysis of oceanographic data</i> (english language) - Aida ALVERA AZCARATE	Q1	20	10	-	<b>3</b>
OCEA0087-1	<i>Satellite oceanography</i> (english language) - Yves CORNET	Q1	15	15	-	<b>3</b>
OCEA0072-1	<i>Geophysical fluid dynamics - part 2</i> (english language) - JeanMarie BECKERS <b>Corequisite :</b> OCEA0071-1 - Geophysical fluid dynamics - part 1	Q1	30	15	-	<b>5</b>
OCEA0081-1	<i>Numerical Methods in Geophysics - Part 2</i> (english language) - JeanMarie BECKERS	Q1	15	30	-	<b>5</b>

#### Instrumentation and methods for space sciences

SPAT0068-1	<i>Astrophysical observations</i> (english language) - Emmanuel JEHIN - [5d FW]	Q2	15	15	[+]	<b>5</b>
PHYS0048-3	<i>Coherent and incoherent optics, Instrumental optics I</i> (english language) - Serge HABRAKEN	Q1	20	15	-	<b>4</b>
SPAT0002-1	<i>Programming techniques, numerical methods and machine learning</i> (english language) - Dominique SLUSE	Q2	10	20	-	<b>3</b>
SPAT0014-1	<i>Introduction to time series analysis</i> (english language) - Eric GOSSET	Q2	20	5	-	<b>3</b>
SPAT0015-1	<i>Signal acquisition and processing : application to embedded systems</i> - Christian SERVAIS	Q2	10	30	-	<b>4</b>
AERO0018-3	<i>Space experiment development</i> (english language) - Jérôme LOICQ	Q2	26	26	-	<b>5</b>
PHYS0125-3	<i>Instrumental optics II</i> (english language) - Serge HABRAKEN <b>Corequisite :</b> PHYS0048-3 - Coherent and incoherent optics	Q2	25	15	-	<b>4</b>
PHYS0931-1	<i>Data processing</i> - Pierre MAGAIN	Q2	15	30	-	<b>5</b>
SSTG0043-1	<i>Placement</i> - Christian BARBIER, Yaël NAZÉ, Grégor RAUW	TA	-	140	-	<b>10</b>
SPAT0067-1	<i>Atmospheric and adaptive optics</i> (english language) - Olivier ABSIL <b>Corequisite :</b> PHYS0048-3 - Coherent and incoherent optics	Q2	15	5	-	<b>2</b>

#### Block 2

##### Compulsory courses

SMEM0029-1	<i>Final thesis</i> - COLLÉGIALITÉ	TA	-	-	-	<b>15</b>
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# Study programmes 2018-2019

## Faculty of Sciences

### Master in space sciences (120 ECTS)

SPAT0070-1 *Final thesis complement* - COLLÉGIALITÉ TA - - - 12

#### Optional courses

Choisir, en accord avec le Jury, un cours non déjà choisis de 3 crédits dans les listes proposées en Bloc 1

[...] In agreement with the jury, chose a course that hasn't already been chosen worth 3 credits from the lists offered in Block 1

#### Choose one focus from the following :

##### Research Focus

[...] Choose courses that haven't already chosen for a total of 30 credits in the curriculum for the Faculties of Sciences or Applied Sciences (especially in the programme for the master in aerospace engineering) at ULiège and/or in the curriculum of another institution. These choices must be motivated by a coherent study programme that must be approved by the jury

##### Professional Focus

##### Compulsory courses

SSTG0052-1	<i>Internship in industry or agency</i> (english language) - Christian BARBIER	TA	-	70	-	5
SPAT0072-1	<i>Seminars on space activities</i> (english language) - Christian BARBIER, Aurélie FUMEL	Q1	30	-	-	5
GEST3162-1	<i>Principles of management</i> (english language) - Michael GHILISSEN, François PICHAULT	Q1	25	25	-	5
SPAT0073-1	<i>Space optics</i> (english language) - Jérôme LOICQ	Q1	30	10	-	5

##### Optional courses

In agreement with the jury, chose courses that haven't already been chosen for a total of 10 credits from the list below:

SPAT0074-1	<i>Internship complement</i> (english language) - Michaël DE BECKER	TA	-	40	-	3
ELEN0008-1	<i>Principles of analog and digital telecommunications systems</i> - Marc VAN DROOGENBROECK	Q2	26	26	-	5
AERO0018-3	<i>Space experiment development</i> (english language) - Jérôme LOICQ	Q2	26	26	-	5
GEOG0037-1	<i>Global Navigation Satellite Systems</i> (english language) - René WARNANT	Q1	40	15	-	5
SPAT0032-2	<i>Remote sensing</i> (english language) - Christian BARBIER	Q1	30	30	-	6

[...] this list can be extended to courses of interest in the space sector included in the curriculum of other master's degrees:

#### Bloc d'aménagement du programme de l'année

### Additional ECTS (max 15-60) Master in space sciences (120 ECTS)

#### Optional courses

The update course, worth a maximum of 60 credits, will be determined based on students' prior training.

[...] Between 15 and 60 ECTS of courses