

## Cycle view of the study programme

B1 Or Th Pr Au Cr

### Compulsory course (B2 : 27Cr)

SMEM0029-1 *Final thesis* - COLLÉGIALITÉ B2 TA - - - 27

### Optional courses (B1 : 60Cr, B2 : 33Cr)

Choose, in agreement with the Jury, courses totalling 63 ECTS from the lists below, including at least one of these first two courses of each list : (B1 : 60Cr, B2 : 3Cr)

#### Space sciences : interdisciplinary courses

SPAT0017-1 *Seminars on topical issues* (english language) - Aïda ALVERA AZCARATE, JeanRené CUDELL, Benoît HUBERT, Damien HUTSEMEKERS B1 TA - 30 - 3

SPAT0035-1 *Space exploration* (english language) - Grégor RAUW B1 Q1 30 10 - 4

SPAT0001-1 *Plasma physics* (english language) - Benoît HUBERT B1 Q2 25 5 - 3

SPAT0018-1 *Ideas evolution in astronomy* - Yaël NAZÉ B1 Q1 14 6 - 2

SPAT0036-1 *Celestial mechanics and space trajectories* (english language) - Grégor RAUW B1 Q1 20 10 - 3

SPAT0039-1 *Spectroscopy in astrophysics and geophysics* (english language) - Jérôme LOICQ B1 Q1 20 10 - 3

SPAT0040-1 *Fluid mechanics* (english language) - Pierre DAUBY B1 Q1 20 10 - 3

#### Cosmology and astroparticle

SPAT0021-1 *Introduction to astroparticles* (english language) - Joseph CUGNON B1 Q1 20 10 - 3

SPAT0012-1 *General relativity, Part 1: Introduction* - Yves DE ROP B1 Q1 20 - - 2

SPAT0010-1 *Theoretical physical cosmology* (english language) - Christian BARBIER, Michel TYTGAT B1 Q2 40 - - 4

#### Corequisite :

SPAT0021-1 - Introduction to astroparticles

SPAT0012-1 - Relativité générale

SPAT0012-2 *General relativity, Part 2: Mathematics methods* - Yves DE ROP B1 Q1 20 - - 2

#### Corequisite :

SPAT0012-1 - Relativité générale

SPAT0012-3 *General relativity, Part 3: supplement* - Yves DE ROP B1 Q2 20 - - 2

#### Corequisite :

SPAT0012-2 - Relativité générale

SPAT0019-1 *Special Relativity* - Jean SURDEJ B1 Q1 15 - - 2

SPAT0060-1 *Astroparticles, Part 1 : the Standard Model* (english language) - JeanRené CUDELL B1 Q1 20 10 - 4

#### Corequisite :

SPAT0062-1 - Quantum field theory

SPAT0060-2 *Astroparticles, Part 2 : gravitational effects* (english language) - JeanRené CUDELL B1 Q2 10 5 - 2

#### Corequisite :

SPAT0062-1 - Quantum field theory

SPAT0012-1 - Relativité générale

SPAT0012-2 - Relativité générale

SPAT0061-1 *Group theory and astroparticles* (english language) - Diego ARISTIZABAL SIERRA B1 Q2 30 - - 3

SPAT0062-1 *Quantum field theory, Part 1 : quantum electrodynamics* (english language) - JeanRené CUDELL B1 Q1 20 10 - 4

#### Corequisite :

PHYS2012-1 - Mécanique quantique et statistiques relativistes

# Study programmes 2015-2016

## Faculty of Sciences

### Master in space sciences (120 ECTS)

	SPAT0019-1 - Relativité restreinte								
SPAT0062-2	<i>Quantum field theory, Part 2 : introduction to renormalization</i> (english language) - JeanRené CUDELL <b>Corequisite :</b> SPAT0062-1 - Quantum field theory	B1	Q2	10	5	-			<b>2</b>
PHYS2012-1	<i>Relativistic quantum mechanics and relativistic statistics</i> - Peter SCHLAGHECK	B1	Q1	20	5	-			<b>3</b>
<b>Astrophysics</b>									
SPAT0033-1	<i>Astrophysics</i> (english language) - Pierre MAGAIN	B1	Q1	30	15	-			<b>5</b>
SPAT0044-1	<i>Stellar Structure and evolution I</i> - MarcAntoine DUPRET	B1	Q1	20	20	-			<b>3</b>
SPAT0005-1	<i>Stellar stability and asteroseismology</i> - MarcAntoine DUPRET <b>Corequisite :</b> SPAT0044-1 - Structure et évolution des étoiles I SPAT0040-1 - Fluid mechanics	B1	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	B1	Q2	20	10	-			<b>3</b>
SPAT0007-2	<i>Variable stars</i> (english language) - Grégor RAUW	B1	Q1	20	10	-			<b>3</b>
SPAT0008-1	<i>Interstellar medium</i> (english language) - Damien HUTSEMEKERS, Yaël NAZÉ	B1	Q1	20	10	-			<b>3</b>
SPAT0009-1	<i>High-energy astrophysics</i> (english language) - Grégor RAUW	B1	Q1	25	5	-			<b>3</b>
SPAT0011-1	<i>Extragalactic astrophysics</i> (english language) - Pierre MAGAIN <b>Corequisite :</b> SPAT0033-1 - Astrophysics	B1	Q2	20	10	-			<b>3</b>
SPAT0020-2	<i>Introduction to astrochemistry</i> (english language) - Michaël DE BECKER	B1	Q2	30	10	-			<b>4</b>
SPAT0045-1	<i>Stellar structure and evolution II</i> - MarcAntoine DUPRET <b>Corequisite :</b> SPAT0044-1 - Structure et évolution des étoiles I	B1	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> SPAT0039-1 - Spectroscopy in astrophysics and geophysics SPAT0044-1 - Structure et évolution des étoiles I	B1	Q2	20	10	-			<b>3</b>
<b>Planetary science and planetary systems</b>									
SPAT0055-1	<i>Atmosphere of the Earth</i> (english language) - Denis GRODENT	B1	Q2	30	15	-			<b>5</b>
SPAT0063-1	<i>Introduction to exoplanetology</i> (english language) - Olivier ABSIL, Michaël GILLON <b>Corequisite :</b> SPAT0033-1 - Astrophysics	B1	Q2	15	5	-			<b>2</b>
SPAT0023-1	<i>Terrestrial magnetosphere and polar lights</i> (english language) - Benoît HUBERT	B1	Q2	30	10	-			<b>4</b>
SPAT0028-2	<i>Planetary magnetospheres and aurorae</i> - Denis GRODENT <b>Corequisite :</b> SPAT0055-1 - Atmosphere of the Earth	B1	Q2	20	10	-			<b>3</b>
SPAT0029-1	<i>Space environment</i> (english language) - Denis GRODENT <b>Corequisite :</b> SPAT0055-1 - Atmosphere of the Earth	B1	Q2	15	15	-			<b>3</b>
SPAT0043-1	<i>The small bodies of the solar system</i> (english language) - Emmanuel JEHIN	B1	Q2	15	5	-			<b>2</b>
SPAT0056-1	<i>Planetary and exoplanetary atmospheres</i> (english language) -	B1	Q1	30	15	-			<b>5</b>

JeanClaude GÉRARD, Denis GRODENT

**Corequisite :**

SPAT0055-1 - Atmosphere of the Earth

GEOL0263-1	<i>Astrobiology</i> - Philippe CLAEYS, Véronique DEHANT, Moreno GALLEN, Emmanuelle JAVAUX, Yaël NAZÉ, Annick WILMOTTE (Even years)	B1	Q2	30	15	-	5
GEOL0304-1	<i>Introduction to neotectonics, seismology and physical volcanology</i> (english language) - HansBalder HAVENITH - [2d FW]	B1	Q1	25	15	[+]	5
SPAT0066-1	<i>Internal geophysics of the Earth and terrestrial bodies of the solar system</i> (english language) - Véronique DEHANT	B1	Q1	25	-	-	3

**Climate, environment and oceanography**

SPAT0027-3	<i>Climate change and impacts</i> - Louis FRANÇOIS, Guy MUNHOVEN	B1	TA	15	45	-	5
OCEA0071-1	<i>Geophysical fluid dynamics - part 1</i> (english language) - JeanMarie BECKERS	B1	Q2	30	15	-	5
SPAT0024-2	<i>Meteorology</i> - Louis FRANÇOIS	B1	Q1	40	20	-	6
SPAT0025-1	<i>Environmental modelling</i> (english language) - Louis FRANÇOIS, Guy MUNHOVEN	B1	Q2	20	10	-	4
SPAT0026-1	<i>Paleoenvironment and evolution of the Earth system</i> (english language) - Louis FRANÇOIS	B1	Q2	30	10	-	4
SPAT0032-2	<i>remote sensing</i> (english language) - Christian BARBIER	B1	Q1	30	30	-	6
SPAT0058-1	<i>Observing Earth from space</i> (english language) - Christian BARBIER	B1	Q1	15	-	-	2
GEOG0037-1	<i>Global Navigation Satellite Systems</i> (english language) - René WARNANT	B1	Q2	40	15	-	5
GEOG0038-1	<i>Space geodesy</i> - René WARNANT - [1d FW]	B1	Q2	20	-	[+]	2
OCEA0045-1	<i>Statistical methods of analysis of oceanographic data</i> (english language) - Aida ALVERA AZCARATE	B1	Q1	20	10	-	3
OCEA0059-2	<i>Remote Sensing of the Oceans, Introduction to satellite oceanography</i> (english language) - Yves CORNET	B1	Q1	15	15	-	3
OCEA0072-1	<i>Geophysical fluid dynamics - part 2</i> (english language) - JeanMarie BECKERS	B1	Q1	30	15	-	5

**Corequisite :**

OCEA0071-1 - Geophysical fluid dynamics - part 1

OCEA0081-1	<i>Numerical Methods in Geophysics - Part 2</i> - JeanMarie BECKERS	B1	Q1	15	30	-	5
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**Instrumentation and methods for space sciences**

SPAT0057-1	<i>Observing the sky</i> (english language) - Jean SURDEJ - [2d FW]	B1	Q1	20	20	[+]	5
PHYS0124-1	<i>Instrumental optics I</i> (english language) - Serge HABRAKEN	B1	Q1	20	15	-	4
SPAT0002-1	<i>Numerical methods and programming basics</i> - N...	B1	Q1	10	20	-	3
SPAT0014-1	<i>Introduction to time series analysis</i> (english language) - Eric GOSSET	B1	Q2	20	5	-	3
SPAT0015-1	<i>Signal acquisition and processing : application to embedded systems</i> - Christian SERVAIS	B1	Q2	10	30	-	4
AERO0018-3	<i>Space experiment development</i> (english language) - Pierre ROCHUS	B1	Q1	30	30	-	5
PHYS0125-3	<i>Instrumental optics II</i> (english language) - Serge HABRAKEN	B1	Q2	25	15	-	4

**Corequisite :**

PHYS0124-1 - Instrumental optics I

PHYS0931-1	<i>Data processing</i> - Pierre MAGAIN	B1	Q2	15	30	-	5
SSTG0043-1	<i>Placement</i> - Christian BARBIER, Yaël NAZÉ, Grégor RAUW	B1	TA	-	140	-	10
SPAT0067-1	<i>Atmospheric and adaptive optics</i> (english language) - Olivier ABSIL	B1	Q2	15	5	-	2

Study programmes 2015-2016  
Faculty of Sciences  
Master in space sciences (120 ECTS)

**Corequisite :**

PHYS0124-1 - Instrumental optics I

SPAT0057-1 - Observing the sky

SPAT0068-1 *Mission of astrophysical observations* (english language) - B1 Q2 5 20 [+] 5  
Jean SURDEJ - [5d FW]

**Single focus (B2 : 1Nbr)**

**Research Focus (B2 : 30Cr)**

[...] Choose courses that haven't already been chosen, for a total of 30 ECTS, from the curriculum of the Faculty of Science or Faculty of Applied Sciences (in particular from the curriculum for the Master in Aerospace Engineering) at ULg and/or from the curriculum of another institution. These choices must be justified by a coherent curriculum plan, which must be approved by the jury.

**Programme transitoire à destination des étudiants ayant réussi leur master 1 de "Master en sciences spatiales, à finalité approfondie" en 2014-2015**

**Compulsory courses (B1 : 27Cr)**

SMEM0029-1 *Final thesis* - COLLÉGIALITÉ B1 TA - - - 27

**Optional courses (B1 : 33Cr)**

[...] Choose, in agreement with the Jury, courses not taken in the 1st year totalling 33 ECTS from the lists offered in Block 1