

**Block view of the study programme**

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**Block 1**
**Core curriculum compulsory courses**

PHYS0974-1	<i>Materials physics and biophysics</i> - Maryse HOEBEKE, Alejandro SILHANEK	Q1	30	-	-	5
PHYS0930-1	<i>Atomic physics</i> - Thierry BASTIN, Peter SCHLAGHECK	Q1	30	-	-	5
PHYS0975-1	<i>Introduction to soft matter and complex systems</i> - Nicolas VANDEWALLE	Q1	30	-	-	5

**Common core courses**

In agreement with the Jury, choose a subject among :

**Basic course**

SSTG0016-1	<i>Training sessions and personal work</i> (english language) - COLLÉGIALITÉ, ISLV	Q2	15	45	-	5
PHYS0983-1	<i>Seminars in advanced physics I</i> (english language) - <i>Materials physics and biophysics</i> - COLLÉGIALITÉ - <i>Atomic physics</i> - COLLÉGIALITÉ - <i>Physics of soft matter and complex systems</i> - COLLÉGIALITÉ	TA				4
			10	-	-	
			10	-	-	
			10	-	-	

Choisir en accord avec le Jury des cours pour un total de 36 crédits parmi :

**Atomic and nuclear**

PHYS0932-1	<i>Cold atoms and atomic clocks</i> - Thierry BASTIN <b>Corequisite :</b> PHYS0930-1 - Physique atomique	Q2	20	10	-	4
PHYS2027-2	<i>Ultracold atoms and Bose-Einstein condensates</i> - Peter SCHLAGHECK <b>Corequisite :</b> PHYS0930-1 - Physique atomique PHYS3021-1 - Mécanique quantique avancée	Q2	25	-	-	4
PHYS0235-2	<i>Quantum optics</i> - John MARTIN <b>Corequisite :</b> PHYS0930-1 - Physique atomique PHYS3021-1 - Mécanique quantique avancée	Q2	20	10	-	4
PHYS0949-1	<i>Atomic structures modelling</i> - Pascal QUINET <b>Corequisite :</b> PHYS0930-1 - Physique atomique	Q2	10	10	-	4
PHYS0941-2	<i>Theoretical physics : Nuclei and particles</i> - JeanRené CUDELL	Q1	30	-	-	4
PHYS3021-1	<i>Advanced quantum mechanics</i> - Thierry BASTIN, John MARTIN, Peter SCHLAGHECK	Q1	30	-	-	4
PHYS0997-1	<i>Quantum information and computation</i> (english language) - François DAMANET	Q1	30	-	-	4
PHYS3136-1	<i>Open quantum systems</i> (english language) - François DAMANET, John MARTIN - [10h Proj.] <b>Corequisite :</b> PHYS3021-1 - Mécanique quantique avancée PHYS0235-2 - Optique quantique	Q2	20	-	[+]	4

**Soft Materials / Statistical Physics**

PHYS0969-1	<i>Introduction to biophotonics</i> - Laurent DREESEN	Q2	20	10	-	4
PHYS0939-2	<i>Physics of non-linearities, chaos and fractals</i> - Nicolas VANDEWALLE <b>Corequisite :</b> PHYS0975-1 - Introduction à la matière molle et aux systèmes complexes	Q2	15	15	-	4
PHYS3020-1	<i>Discrete element method and soft materials</i> - Eric OPSOMER - [15h Proj.]	Q2	20	-	[+]	4

**Materials / Solid State**

PHYS3003-1	<i>Physics of functional oxides</i> (english language) - Philippe GHOSEZ <b>Corequisite :</b> PHYS0974-1 - Physique des matériaux et biophysique	Q1	20	10	-	<b>4</b>
PHYS3004-1	<i>Physics of nanomaterials</i> (english language) - JeanYves RATY <b>Corequisite :</b> PHYS0974-1 - Physique des matériaux et biophysique	Q2	20	10	-	<b>4</b>
PHYS3023-1	<i>Physics of magnetic materials</i> (english language) - Eric BOUSQUET <b>Corequisite :</b> PHYS0974-1 - Physique des matériaux et biophysique	Q2	20	10	-	<b>4</b>
PHYS0981-1	<i>Quantum modelling of materials properties</i> (english language) - Philippe GHOSEZ <b>Corequisite :</b> PHYS0974-1 - Physique des matériaux et biophysique	Q1	20	10	-	<b>4</b>
CHIM0202-2	<i>Physical Chemistry</i> - Christian DAMBLON, Bernard LEYH	Q2	30	-	-	<b>4</b>
PHYS0987-1	<i>Physics of materials for energy</i> (english language) - Ngoc Duy NGUYEN - [15h Proj.]	Q1	20	-	[+]	<b>4</b>
PHYS0988-1	<i>Intrinsic and induced topological properties of matter</i> (english language) - Bertrand DUPÉ	Q2	20	10	-	<b>4</b>

**Quantum Physics and Relativity**

PHYS2012-1	<i>Relativistic quantum mechanics and relativistic statistics</i> - Peter SCHLAGHECK	Q1	20	5	-	<b>4</b>
SPAT0012-1	<i>General relativity</i> (english language) - Guillaume MAHLER	Q1	30	10	-	<b>4</b>

**Experimental Physics**

PHYS0250-2	<i>Experimental statistical physics</i> - Stéphane DORBOLO <b>Corequisite :</b> PHYS0975-1 - Introduction à la matière molle et aux systèmes complexes	Q2	10	20	-	<b>4</b>
PHYS3019-1	<i>Techniques of experimental physics</i> - Geoffroy LUMAY	Q2	20	20	-	<b>4</b>
PHYS0943-1	<i>Spectroscopy of electronic paramagnetic resonance</i> - Maryse HOEBEKE <b>Corequisite :</b> PHYS0974-1 - Physique des matériaux et biophysique	Q2	15	15	-	<b>4</b>
PHYS0095-1	<i>The physics of accelerators and vacuum technologies</i> - David STRIVAY	Q2	10	10	-	<b>4</b>
PHYS0968-1	<i>Signal processing</i> - Alejandro SILHANEK	Q2	25	20	-	<b>4</b>
PHYS3037-1	<i>Nanofabrication : principles and techniques</i> (english language) - Ngoc Duy NGUYEN, Alejandro SILHANEK <b>Corequisite :</b> PHYS0974-1 - Physique des matériaux et biophysique	Q2	25	15	-	<b>4</b>
PHYS0999-1	<i>Digital creation in sciences</i> - Roland BILLEN, Valentin FISCHER, Pierre MATHONET, JeanChristophe MONBALIU, Eric PARMENTIER, Nicolas VANDEWALLE - [30h Proj.]	TA	10	-	[+]	<b>5</b>

**Optics and Imaging**

PHYS0942-3	<i>Ionising radiations and imaging</i> - Alain SERET	Q1	20	5	-	<b>4</b>
PHYS0938-1	<i>Physics and cultural heritage</i> - David STRIVAY	Q1	15	5	-	<b>4</b>
PHYS0048-2	<i>Coherent and incoherent optics</i> (english language) - <i>Coherent optics and lasers applications</i> - Serge HABRAKEN - <i>Laser physics</i> - Serge HABRAKEN	Q1		10 5	15 5	- -
PHYS0048-3	<i>Coherent and incoherent optics, Instrumental optics I</i> (english language) - Serge HABRAKEN	Q1	20	15	-	<b>4</b>
PHYS0128-1	<i>Magnetic Resonance Imaging - the Basics</i> (english language) -	Q1	15	-	[+]	<b>2</b>

LAMALLE - [3d FW]

**Applied physics**

INFO0939-1	<i>High performance scientific computing</i> (english language) - Christophe GEUZAINÉ - [20h Proj.]	Q1	30	15	[+]	<b>5</b>
MECA0470-1	<i>New methods in computational mechanics and physics</i> (english language) - Maarten ARNST, Eric BÉCHET, Ludovic NOELS - [40h Proj.]	Q2	20	-	[+]	<b>5</b>
ELEN0062-1	<i>Introduction to machine learning</i> (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	Q1	30	5	[+]	<b>6</b>

**Didactics**

PHYS0979-1	<i>Conceptual approach to basic physics</i> - Hervé CAPS, Maryse HOEBEKE	Q1	30	-	-	<b>4</b>
AESS0241-1	<i>Introduction to physics didactics</i> - Maryse HOEBEKE	Q1	20	-	-	<b>4</b>

[...] Up to 20 credits (or more, in agreement with the Jury) in the two blocks may also be chosen in another study field or institution

**Course Medical Physics**

PHYS0952-3	<i>Imaging through ionising radiation</i> - Alain SERET <b>Corequisite :</b> PHYS0990-1 - Dosimétrie PHYS0989-1 - Radiobiology	Q1	25	5	-	<b>4</b>
PHYS0989-1	<i>Radiobiology</i> (english language) - Olivier VAN HOEY <b>Corequisite :</b> PHYS0990-1 - Dosimétrie PHYS0952-3 - Imagerie par radiations ionisantes	Q2	10	-	-	<b>2</b>
PHYS0990-1	<i>Dosimetry</i> - Véronique BAART, Luca PELLEGRINI <b>Corequisite :</b> PHYS0989-1 - Radiobiology PHYS0952-3 - Imagerie par radiations ionisantes	Q2	20	-	-	<b>3</b>
RADI2001-1	<i>Radioprotection: hygiene problems</i> - Nadia WITHOFS <b>Corequisite :</b> PHYS0990-1 - Dosimétrie PHYS0989-1 - Radiobiology RADP0141-1 - Radioprotection BIOL0007-1 - Biologie tissulaire PHYS0952-3 - Imagerie par radiations ionisantes	Q1	15	-	-	<b>2</b>
BIOL0007-1	<i>Tissue biology</i> - Marc THIRY	Q1	15	25	-	<b>4</b>
PHYL0644-1	<i>Human Anatomy and Physiology</i> - Valérie DEFAWEUX	Q2	30	-	-	<b>3</b>
ANAT0222-1	<i>Elements of Radiology</i> - Paul MEUNIER, Luaba TSHIBANDA, Christophe VALKENBORGH	Q1	10	5	-	<b>2</b>
CHIM0620-1	<i>Radiopharmaceutical Chemistry</i> - Thibault GENDRON	Q1	20	10	-	<b>3</b>
PHYS0128-1	<i>Magnetic Resonance Imaging - the Basics</i> (english language) - Laurent LAMALLE - [3d FW] <b>Corequisite :</b> PHYS0930-1 - Physique atomique	Q1	15	-	[+]	<b>2</b>
RADP0141-1	<i>Radioprotection</i> - Part a) <i>Radioprotection techniques and complements</i> - Véra PIRLET - Part b) <i>Legislation on radioprotection and the organisation of a radiotherapy, radiodiagnostic and nuclear medicine department</i> - Véra PIRLET	Q2	30 10	15 -	- -	<b>6</b>
SSTG0041-1	<i>Placement in medical radiophysics</i> - Véronique BAART, Claire BERNARD, Alain SERET - [12d Internship] <b>Corequisite :</b>	Q2	2	-	[+]	<b>7</b>

	PHYS0990-1 - Dosimétrie							
	PHYS0989-1 - Radiobiology							
	PHYS0952-3 - Imagerie par radiations ionisantes							
STAT0420-1	<i>Biostatistics 2</i> - AnneFrançoise DONNEAU	Q1	15	15	-	-	-	<b>3</b>
PHYS0968-1	<i>Signal processing</i> - Alejandro SILHANEK	Q2	25	20	-	-	-	<b>4</b>

**Block 2**

**Focus compulsory courses**

PHYS0991-1	<i>Special applications and techniques in radiotherapy</i> - Véronique BAART, Luca PELLEGRINI <b>Prerequisite :</b> PHYS0989-1 - Radiobiology PHYS0990-1 - Dosimétrie	Q1	35	-	-	-	-	<b>4</b>
PHYS0992-1	<i>Special applications and techniques in radiodiagnostic (english language)</i> - Hilde BOSMANS <b>Prerequisite :</b> PHYS0952-3 - Imagerie par radiations ionisantes PHYS0989-1 - Radiobiology	Q1	15	-	-	-	-	<b>2</b>
PHYS0993-1	<i>Special applications and techniques in nuclear medicine</i> - Claire BERNARD, Roland HUSTINX, Alain SERET <b>Prerequisite :</b> PHYS0952-3 - Imagerie par radiations ionisantes PHYS0989-1 - Radiobiology	Q1	20	-	-	-	-	<b>3</b>
PHYS0994-1	<i>Internal dosimetry of radiopharmaceutical compounds</i> - Claire BERNARD, Christophe MERCIER, Alain SERET <b>Prerequisite :</b> PHYS0952-3 - Imagerie par radiations ionisantes PHYS0989-1 - Radiobiology	Q1	8	4	-	-	-	<b>2</b>
PHYS0995-1	<i>Computerized dosimetry specialized in radiotherapy (english language)</i> - Edmond STERPIN <b>Prerequisite :</b> PHYS0989-1 - Radiobiology PHYS0990-1 - Dosimétrie	Q1	15	-	-	-	-	<b>2</b>
PHYS0996-1	<i>2D &amp; 3D tomographical reconstruction</i> - Alain SERET <b>Prerequisite :</b> PHYS0968-1 - Traitement du signal PHYS0952-3 - Imagerie par radiations ionisantes	Q1	10	-	-	-	-	<b>1</b>
SSTG0015-2	<i>Training</i> - COLLÉGIALITÉ - [3mois Internship] <b>Prerequisite :</b> PHYS0952-3 - Imagerie par radiations ionisantes PHYS0989-1 - Radiobiology PHYS0990-1 - Dosimétrie <b>Corequisite :</b> PHYS0991-1 - Applications et techniques spéciales en radiothérapie PHYS0992-1 - Applications et techniques spéciales en radiodiagnostic PHYS0993-1 - Applications et techniques spéciales en médecine nucléaire PHYS0994-1 - Dosimétrie interne des composés radiopharmaceutiques PHYS0995-1 - Computerized dosimetry specialized in radiotherapy PHYS0996-1 - Reconstruction tomographique 2D & 3D	TA	-	-	-	-	[+]	<b>16</b>

**Core curriculum compulsory course**

SMEM0028-1	<i>Final thesis</i> - COLLÉGIALITÉ	TA	-	-	-	-	-	<b>18</b>
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**Common core courses**

**In agreement with the Jury, choose a subject among :**

**Basic course**

PHYS0984-1	<i>Seminars in advanced physics II</i> (english language) - <i>Materials physics and biophysics</i> - COLLÉGIALITÉ - <i>Atomic physics</i> - COLLÉGIALITÉ - <i>Physics of soft matter and complex systems</i> - COLLÉGIALITÉ	TA							<b>4</b>
	<b>Prerequisite :</b> PHYS0983-1 - Séminaires de Physique avancée I		10	-	-				
			10	-	-				
			10	-	-				

Choisir en accord avec le Jury des cours non déjà choisis pour un total de 8 crédits parmi :

**Atomic and nuclear**

PHYS0932-1	<i>Cold atoms and atomic clocks</i> - Thierry BASTIN <b>Corequisite :</b> PHYS0930-1 - Physique atomique	Q2	20	10	-	-			<b>4</b>
PHYS2027-2	<i>Ultracold atoms and Bose-Einstein condensates</i> - Peter SCHLAGHECK <b>Corequisite :</b> PHYS0930-1 - Physique atomique PHYS3021-1 - Mécanique quantique avancée	Q2	25	-	-				<b>4</b>
PHYS0235-2	<i>Quantum optics</i> - John MARTIN <b>Corequisite :</b> PHYS0930-1 - Physique atomique PHYS3021-1 - Mécanique quantique avancée	Q2	20	10	-	-			<b>4</b>
PHYS0949-1	<i>Atomic structures modelling</i> - Pascal QUINET <b>Corequisite :</b> PHYS0930-1 - Physique atomique	Q2	10	10	-	-			<b>4</b>
PHYS0941-2	<i>Theoretical physics : Nuclei and particles</i> - JeanRené CUDELL	Q1	30	-	-				<b>4</b>
PHYS3021-1	<i>Advanced quantum mechanics</i> - Thierry BASTIN, John MARTIN, Peter SCHLAGHECK	Q1	30	-	-				<b>4</b>
PHYS0997-1	<i>Quantum information and computation</i> (english language) - François DAMANET	Q1	30	-	-				<b>4</b>
PHYS3136-1	<i>Open quantum systems</i> (english language) - François DAMANET, John MARTIN - [10h Proj.] <b>Corequisite :</b> PHYS3021-1 - Mécanique quantique avancée PHYS0235-2 - Optique quantique	Q2	20	-		[+]			<b>4</b>

**Soft Materials / Statistical Physics**

PHYS0969-1	<i>Introduction to biophotonics</i> - Laurent DREESEN	Q2	20	10	-	-			<b>4</b>
PHYS0939-2	<i>Physics of non-linearities, chaos and fractals</i> - Nicolas VANDEWALLE <b>Corequisite :</b> PHYS0975-1 - Introduction à la matière molle et aux systèmes complexes	Q2	15	15	-	-			<b>4</b>
PHYS3020-1	<i>Discrete element method and soft materials</i> - Eric OPSOMER - [15h Proj.]	Q2	20	-		[+]			<b>4</b>
PHYS0948-1	<i>Microgravity</i> - Martial NOIRHOMME, Nicolas VANDEWALLE - [3d FW] <b>Corequisite :</b> PHYS0975-1 - Introduction à la matière molle et aux systèmes complexes	Q2	10	20		[+]			<b>4</b>

**Materials / Solid State**

PHYS3003-1	<i>Physics of functional oxides</i> (english language) - Philippe GHOSEZ <b>Corequisite :</b> PHYS0974-1 - Physique des matériaux et biophysique	Q1	20	10	-	-			<b>4</b>
PHYS3004-1	<i>Physics of nanomaterials</i> (english language) - JeanYves RATY <b>Corequisite :</b> PHYS0974-1 - Physique des matériaux et biophysique	Q2	20	10	-	-			<b>4</b>
PHYS3023-1	<i>Physics of magnetic materials</i> (english language) - Eric BOUSQUET <b>Corequisite :</b>	Q2	20	10	-	-			<b>4</b>

	PHYS0974-1 - Physique des matériaux et biophysique						
PHYS0981-1	<i>Quantum modelling of materials properties</i> (english language) - Philippe GHOSEZ <b>Corequisite :</b> PHYS0974-1 - Physique des matériaux et biophysique	Q1	20	10	-		4
CHIM0202-2	<i>Physical Chemistry</i> - Christian DAMBLON, Bernard LEYH	Q2	30	-	-		4
PHYS0987-1	<i>Physics of materials for energy</i> (english language) - Ngoc Duy NGUYEN - [15h Proj.]	Q1	20	-	[+]		4
PHYS0988-1	<i>Intrinsic and induced topological properties of matter</i> (english language) - Bertrand DUPÉ	Q2	20	10	-		4
<b>Quantum Physics and Relativity</b>							
PHYS2012-1	<i>Relativistic quantum mechanics and relativistic statistics</i> - Peter SCHLAGHECK	Q1	20	5	-		4
SPAT0012-1	<i>General relativity</i> (english language) - Guillaume MAHLER	Q1	30	10	-		4
<b>Experimental Physics</b>							
PHYS0250-2	<i>Experimental statistical physics</i> - Stéphane DORBOLO <b>Corequisite :</b> PHYS0975-1 - Introduction à la matière molle et aux systèmes complexes	Q2	10	20	-		4
PHYS3019-1	<i>Techniques of experimental physics</i> - Geoffroy LUMAY	Q2	20	20	-		4
PHYS0943-1	<i>Spectroscopy of electronic paramagnetic resonance</i> - Maryse HOEBEKE <b>Corequisite :</b> PHYS0974-1 - Physique des matériaux et biophysique	Q2	15	15	-		4
PHYS0095-1	<i>The physics of accelerators and vacuum technologies</i> - David STRIVAY	Q2	10	10	-		4
PHYS0968-1	<i>Signal processing</i> - Alejandro SILHANEK	Q2	25	20	-		4
PHYS3037-1	<i>Nanofabrication : principles and techniques</i> (english language) - Ngoc Duy NGUYEN, Alejandro SILHANEK <b>Corequisite :</b> PHYS0974-1 - Physique des matériaux et biophysique	Q2	25	15	-		4
PHYS0999-1	<i>Digital creation in sciences</i> - Roland BILLEN, Valentin FISCHER, Pierre MATHONET, JeanChristophe MONBALIU, Eric PARMENTIER, Nicolas VANDEWALLE - [30h Proj.]	TA	10	-	[+]		5
<b>Optics and Imaging</b>							
PHYS0942-3	<i>Ionising radiations and imaging</i> - Alain SERET	Q1	20	5	-		4
PHYS0938-1	<i>Physics and cultural heritage</i> - David STRIVAY	Q1	15	5	-		4
PHYS0048-2	<i>Coherent and incoherent optics</i> (english language) - <i>Coherent optics and lasers applications</i> - Serge HABRAKEN - <i>Laser physics</i> - Serge HABRAKEN	Q1		10 5	15 5	- -	4
PHYS0048-3	<i>Coherent and incoherent optics, Instrumental optics I</i> (english language) - Serge HABRAKEN	Q1	20	15	-		4
PHYS0128-1	<i>Magnetic Resonance Imaging - the Basics</i> (english language) - Laurent LAMALLE - [3d FW]	Q1	15	-	[+]		2
PHYS0125-3	<i>Instrumental optics II</i> (english language) - Serge HABRAKEN <b>Prerequisite :</b> PHYS0048-3 - Coherent and incoherent optics	Q2	25	15	-		4
<b>Applied physics</b>							
INFO0939-1	<i>High performance scientific computing</i> (english language) - Christophe GEUZAIN - [20h Proj.]	Q1	30	15	[+]		5
MECA0470-1	<i>New methods in computational mechanics and physics</i> (english language) - Maarten ARNST, Eric BÉCHET, Ludovic NOELS - [40h Proj.]	Q2	20	-	[+]		5

ELEN0062-1	<i>Introduction to machine learning</i> (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	Q1	30	5	[+]	<b>6</b>
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**Didactics**

PHYS0979-1	<i>Conceptual approach to basic physics</i> - Hervé CAPS, Maryse HOEBEKE	Q1	30	-	-	<b>4</b>
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AESS0241-1	<i>Introduction to physics didactics</i> - Maryse HOEBEKE	Q1	20	-	-	<b>4</b>
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[...] Up to 20 credits (or more, in agreement with the Jury) in the two blocks may also be chosen in another study field or institution

**Course Medical Physics**

QUAL0722-1	<i>Safety and quality assurance</i> (english language) - Edmond STERPIN	Q2	5	10	-	<b>2</b>
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**Prerequisite :**

SSTG0041-1 - Stages en radiophysique médicale

RADL0442-1	<i>Radiobiology and radiopathology elements</i> - Chantal HUMBLET	Q1	40	20	-	<b>6</b>
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**Prerequisite :**

BIOL0007-1 - Biologie tissulaire

PHYL0644-1 - Anatomie et physiologie humaines

ANAT0222-1 - Eléments d'anatomie radiologique

PHYS2024-1	<i>Transfer and co-registration of medical images</i> - Mohamed Ali BAHRI	Q1	15	-	-	<b>2</b>
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CHIM0621-2	<i>Production and application of radioelements</i> - Thibault GENDRON - [3d FW]	Q2	15	-	[+]	<b>2</b>
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**Bloc d'aménagement du programme de l'année**

**Bridging courses (max 15-60 credits) Master in physics (120 credits)**

**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 from "Bachelier en sciences physiques"