

2025-2026 MASTER EN INGENIERIE PHYSIQUE - Options

validé par la Vice-présidence académique le 19 juin 2025

CODE	MATIERES	ENSEIGNANTS sous réserve de modification	SEMESTRES						CRE DITS ECTS	
			MA1/MA3			MA2/MA4				EXA
			cours	exercices	course	cours	exercices	course		
Groupe I "Options"									38	
Options Ib - Ingénierie								min. 19		
PHYS-476	Advanced superconducting magnet technologies	Riccioli				2	2		4	oral
PHYS-761	Attosecond radiation sources	Carbone/Puppin	2	2					4	oral
PHYS-463	Computational quantum physics	Carleo				2	2		6	oral
PHYS-403	Computer simulation of physical systems I	Pasquarello	2	2					4	oral
MSE-450	Electron microscopy: advanced methods	Alexander				2	1		3	oral
PHYS-407	Frontiers in nanosciences	Pivetta	2	2					4	oral
PHYS-438	Fundamentals of biomedical imaging	Xin				2	2		4	écrit
PHYS-448	Introduction to particle accelerators	Pieloni	2	2					4	écrit
PHYS-467	Machine learning for physicists	Zdeborová	2	2	1				6	écrit
QUANT-410	Microwave engineering in physics	Manucharyan				2	1	1	4	oral
PHYS-442	Modeling and design of experiments	Fuerbringer	2	1	1				4	oral
PHYS-473	MRI Practicals on CIBM preclinical imaging systems	Cudalbu/Lanz/Lê	2		2	sans retrait			4	sem A
PHYS-460	Nonlinear dynamics, chaos and complex systems	Février				3	2		6	oral
PHYS-470	Nonlinear optics for quantum technologies	Galland				2	2		4	écrit
PHYS-445	Nuclear fusion and plasma physics	Fasoli	2	2					4	oral
PHYS-461	Nuclear interaction: from reactors ...(pas donné en 25	Rochman	2	2					4	écrit
PHYS-440	Particle detection	Haefeli	2	2					4	sem A
PHYS-468	Physics of life	Stahlberg				2	2		4	écrit
PHYS-474	Physics of low-dimensional materials	Wäckerlin				2	2		4	oral
PHYS-307	Physics of materials	La Grange	2	2					4	oral
PHYS-434	Physics of photonic semiconductor devices	Butté				2	2		4	écrit
PHYS-424	Plasma II	Reimerdes				2	2		6	oral
PHYS-454	Quantum optics and quantum information	Brantut				2	2		6	écrit
PHYS-462	Quantum transport in mesoscopic systems	Banerjee				2	2		4	oral
PHYS-450	Radiation biology, protection and applications	Pakari/Damet/Grilj	2	1					4	écrit
PHYS-452	Radiation detection	Lamirand	2	1					4	oral
PHYS-400	Selected topics in nuclear and particle physics	Blanc F.				2	2		4	oral
PHYS-433	Semiconductor physics and light-matter interaction	Butté	2	2					4	écrit
PHYS-464	Solid state systems for quantum information	Scarlino				2	2		4	oral
PHYS-510	Spintronics : basics and applications	Pivetta/Rusponi				2	2		4	oral
PHYS-466	Topics in biophysics and physical biology	Manley				2	1		3	sem P

Options Ib - Physique									
PHYS-472	Astrophysics II : interactions radiation-matter	Jablonka	2	2				4	écrit
PHYS-465	Astrophysics III : galaxy formation and evolution	Hirschmann	2	2				4	oral
PHYS-401	Astrophysics IV : stellar and galactic dynamics	Revaz				2	2	4	oral
PHYS-402	Astrophysics V : observational cosmology	Kneib				2	2	4	oral
PHYS-302	Biophysics : physics of biological systems	Rahi	2	2				4	sem A
PHYS-502	Interacting quantum matter (pas donné en 2025-26)	Läuchli	3	1				4	oral
PHYS-439	Introduction to astroparticle physics	Neronov/Perrina + Savchenko				2	2	4	oral
PHYS-491	Magnetism in materials	Zivkovic				2	2	4	oral
PHYS-469	Mathematical aspects of quantum physics	Bossoney	2	2				4	oral
PHYS-504	Modern approaches to quantum gravity	Guica	2	2				8	oral
PHYS-640	Neutron and X-ray scattering of quantum materials	Fogh/Schmitt/Rønnow	2	2				4	oral
PHYS-415	Particle physics I	Marchevski	2	2				4	oral
PHYS-416	Particle physics II	Shchutska				2	2	4	oral
PHYS-471	Particle physics: the flavour frontiers	Marchevski				2	2	4	oral
PHYS-423	Plasma I	Theiler	2	3				6	oral
PHYS-541	Quantum computing	Savona	3	2				6	oral
PHYS-453	Quantum electrodynamics and quantum optics	Kippenberg	2	2				6	écrit
PHYS-431	Quantum field theory I	Rattazzi	3	2				6	oral
PHYS-432	Quantum field theory II	Rattazzi				3	2	6	oral
PHYS-503	Quantum field theory III	Rattazzi	3	1				8	oral
PHYS-550	Quantum information theory	Holmes	2	2				4	écrit
PHYS-425	Quantum physics III	Yazyev	2	3				6	oral
PHYS-426	Quantum physics IV	Carleo/Rossi				2	2	6	écrit
PHYS-427	Relativity and cosmology I	Kunz	3	2				6	écrit
PHYS-428	Relativity and cosmology II	Gorbenko				2	2	6	écrit
PHYS-419	Solid state physics III	Herviou	3	2				6	oral
PHYS-420	Solid state physics IV	Carbone				2	2	4	oral
PHYS-475	Statistical Physics : Theory of phase transitions	De Los Rios	2	2				4	écrit
PHYS-435	Statistical physics III (pas donné en 2025-26)	Wyart	2	2				6	écrit
PHYS-436	Statistical physics IV	Kippenberg				2	2	6	écrit
PHYS-441	Statistical physics of biomacromolecules	De Los Rios	2	2				4	oral
PHYS-512	Statistical physics of computation	Erba	2	2				4	écrit
PHYS-505	The standard model	Riembau	3	1				8	oral
Options : cours faculté FSB, Liste des cours agréés par SPH et cours autres facultés :								max. 18	
- cours de cycle bachelor 3e année et cycle master des sections SCGC et SMA									
- liste des cours agréés par la Section de Physique									
- cours à option de 3ème année de SPH pour autant qu'ils n'aient pas été suivis au bachelor et pour un maximum de 6 crédits									
- cours de 3e année et du cycle master des sections d'ingénierie EPFL, sous réserve de l'approbation de la direction de la section (max. 6 crédits)									

Translation:

Options: Courses FSB Faculty, List of courses approved by SPH, and courses from other faculties: max. 18 credits

- 3rd-year Bachelor and Master-level courses from the SCGC and SMA sections
- List of courses approved by the Physics Section
- 3rd-year elective courses from SPH, provided they were not taken during the Bachelor and up to a max. of 6 credits
- 3rd-year and Master-level courses from EPFL engineering sections, subject to approval by the section (max. 6 credits)

sans retrait = no withdrawal = not possible to withdraw from this course after the registration deadline

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			MA1/MA3			MA2/4				
			cours	course based	ind. proj.	course based	ind. proj.			
Bloc "Projets et SHS"								22		
PHYS-421	Projet de Physique I	Divers enseignants / sans retrait **			8			8	sem A	
PHYS-422	Projet de Physique II	Divers enseignants / sans retrait **					8	8	sem P	
Domaine des projets de Physique										
	Astrophysics, particles, high energy physics	Anderson, Dufour, Gorbenko, Hirschmann, Kneib, Marchevski, Penedones, Perrina, Rattazzi, Schneider, Seidel, Shchutska, Tolley								
	Condensed matter physics	Banerjee, Brune, Carbone, Carleo, Grandjean, Guizar-Sicairos, Hébert, Läuchli, Mila, Pasquarello, Rønnow, Yazyev, Wäckerlin								
	Physics of biological and complex systems	De Los Rios, Gruetter, Karampinos, Krzakala, Manley, Rahi, Ramirez, Ricci, Stahlberg, Wyart, Xin, Zdeborova								
	Plasma physics and energy	Fasoli, Pautz, Ricci, Seidel, Theiler								
	Quantum science and technology	Banerjee, Brantut, Carbone, Carleo, Grandjean, Holmes, Kippenberg, Manucharyan, Quek, Savona, Scarlino								
HUM-nnn	SHS : introduction au projet	Divers enseignants	2	1				3	sem A	
HUM-nnn	SHS : projet /	Divers enseignants / sans retrait **			3			3	sem P	
Groupe I "Options"								38		
	--- voir liste									
Groupe II "MA3" - à choix								30		
	- Cours options du Groupe II b ou							30		
PHYS-596	- Stage d'ingénierie (master en Ingénierie physique) (min. 4/max. 6 mois) ou				680h	680h		30	sem A/P	
	- Mineur							30		
Total des crédits du cycle master en Ingénierie Physique								90		
PHYS-599	Projet de master en ingénierie physique (17 ou 25 semaines)				900h	900h		30	oral	
Total des crédits du master en Physique								120		

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Group IIb :

List of "Group Ib engineering options courses" + 18 credits maximum from the list of approved "engineering" courses

Minors :

The master curriculum may be complemented with a Minor offered at EPFL, with one exception : the Minor in " Physics" may not be chosen by physics students. The selection of courses making up a minor is done with the approval of the person in charge of the minor. The minor courses can be taken from MA1 onwards

Engineering internship

The 4 to 6 consecutive months internship is credited with 30 credits. See terms and conditions in the implementing regulation