Studies Plan

Science et ingénierie computationelles 2024-25

Block 1

Language	Course / Code	Section	Teacher	Specialization	M1 c	M1 e	M1 p	M2 l	M2 e	M2 p	Exam Session	Exam	Credit
	Advanced numerical analysis II												
E	MATH-351	MA	Picasso		2h	2h					Win	Written	5
	Algorithms I												
E	CS-250	IN	Chiesa Svensson					4h	2h		Sum	Written	8
	Computer simulation of physical systems I												
E	PHYS-403	PH	Pasquarello		2h	2h					Win	Oral	4
	Image processing I												
E	MICRO-511	MT	Unser Van De Ville		3h						Win	Written	3
	Machine learning												
E	CS-433	IN	Flammarion Jaggi		4h	2h	2h				Win	Written	8
	Molecular dynamics and Monte-Carlo simulation												
E	CH-351	CGC	Röthlisberger					1h	1h		Sum	During the semester	2
	Numerical analysis and computational mathematics												
E	MATH-456	MA	Grigori		2h	2h					Win	Written	4
	Parallel and high-performance computing												
E	MATH-454	MA	Antolin Sanchez					2h	1h	1h	Sum	Oral	4
	Parallelism and concurrency in software												
E	CS-302	IN	Falsafi					3h	1h	2h	Sum	During the semester	6
	Programming concepts in scientific computing												
E	MATH-458	MA	Anciaux		2h	2h					Win	During the semester	4

Block SHS Master

Language	Course / Code	Section	Teacher	Specialization	Exam Session	Exam	Credit
	HSS : Introduction to project						
		SHS			Win		3
	HSS : Project						
		SHS			Sum		3

Group 1

Language	Course / Code	Section	Teacher	Specialization	M1 c	M1 e	M1 p	M2 l	M2 e	M2 p	MP Autumn l	MP Autumn e	MP Autumn p	MP Spring l	MP Spring e	MP Spring p	Exam Session	Exam	Credit
	CSE project I																		
F	MATH-591	MA	Profs divers			8h			8h								Sum Win	During the semester	8
	CSE project II																		
F	MATH-592	MA	Profs divers			8h			8h								Sum Win	During the semester	8
	Engineering internship (master in computational sciences and engineering																		
F	MATH-595	MA	Profs divers			320h			320h			320h				320h	Sum Win	During the semester	8

Group 2

C : Courses, E : Exercice, P : Pratic courses, * : option courses / F : French courses, D : Deutsch courses, E : English Courses / Sum : Summer, Win : Winter

(Handwritten margin notes: "32 creds", "25/27", "16 creds", "V V V", "A B C D")

Language	Code	Section	Teacher	Course	Master 1		Master 2			Exam Session	Exam	Credit
E	CS-471	IN	Falsafi	**Advanced multiprocessor architecture**	4h	8h				Win	During the semester	8
E	CS-450	IN	Kapralov Svensson	**Algorithms II**	4h	3h				Win	Written	8
E	CS-401	SC	Brbic	**Applied data analysis**	2h	2h				Win	Written	8
E	MSE-468	MX	Pizzi	**Atomistic and quantum simulations of materials**			3h		1h	Sum	During the semester	4
E	MATH-453	MA	Kressner	**Computational linear algebra**			2h	2h		Sum	Written	5
E	CH-452	CGC	Bonella	**Computational methods in molecular quantum mechanics**	2h	1h				Win	Oral	4
E	NX-465	NX	Gerstner	**Computational neurosciences: neuronal dynamics**			2h	2h		Sum	Written	5
E	EE-559	EL	Cavallaro	**Deep learning**			2h	2h		Sum	During the semester	4
E	CS-502	IN		**Deep learning in biomedicine**			2h	1h	2h	Sum	During the semester	6
E	CS-456	IN	Gulcehre	**Deep reinforcement learning**			2h	1h	1h	Sum	Written	6
E	ENG-466	SIE	Martinoli	**Distributed intelligent systems**	2h	2h				Win	Oral	5
E	COM-502	SC	Thiran	**Dynamical system theory for engineers**			3h	1h		Sum	Written	6
E	ENG-420	SIE	Crouzy Porté-Agel	**Environmental transport phenomena**	2h	1h 2h				Win	Written	5
E	COM-406	IN	Gastpar Urbanke	**Foundations of Data Science**	4h	2h				Win	Written	8
E	CS-457	IN	Pauly	**Geometric computing**	3h	1h 1h				Win	Written	6
E	MATH-505	MA	Grigori	**HPC for numerical methods and data analysis**	2h	2h				Win	Oral	5
E	ME-444	GM	Gallaire	**Hydrodynamics**			2h	2h		Sum	Written	5
E	MICRO-512	MT	Liebling Sage Unser Van De Ville	**Image processing II**			3h			Sum	Written	3
E	COM-402	IN	Payer	**Information security and privacy**	3h	1h 2h				Win	Written	8
E	ME-466	GM	Gallaire	**Instability**	2h	1h				Win	Written	3
E	CH-353	CGC	Röthlisberger	**Introduction to electronic structure methods**	2h	2h				Win	During the semester	4
E	MATH-463	MA	Bierlaire	**Mathematical modelling of behavior**	2h	2h				Win	Written	5
E	EE-556	EL	Cevher	**Mathematics of data: from theory to computation**	3h	3h				Win	Written	6
E	CH-453	CGC	Vanicek	**Molecular quantum dynamics**			2h	1h		Sum	Oral	3
E	MATH-451	MA	Buffa	**Numerical approximation of PDEs**			2h	2h		Sum	Written	5
E	ME-474	GM	Boujo	**Numerical flow simulation**	2h	2h				Win	During the semester	5
E	MATH-452	MA	Blumenthal	**Numerical integration of dynamical systems**			2h	2h		Sum	Written	5

C : Courses, E : Exercice, P : Pratic courses, * : option courses / F : French courses, D : Deutsch courses, E : English Courses / Sum : Summer, Win : Winter

Language	Code	Section	Teacher						Session	Exam	Credit
Numerical integration of stochastic differential equations											
E	MATH-450	MA	Nobile	2h	2h				Win	Written	5
Numerical methods for conservation laws											
E	MATH-459	MA	Licht	2h	2h				Win	Oral	5
Numerics for fluids, structures & electromagnetics											
E	MATH-468	MA		2h	2h				Win	Oral	5
Optimization for machine learning											
E	CS-439	IN	Flammarion Jaggi			2h	2h	1h	Sum	Written	8
Principles and applications of systems biology											
E	ChE-411	CGC	Hatzimanikatis	2h	1h				Win	During the semester	3
Randomized matrix computations											
E	MATH-403	MA	Kressner	2h	2h				Win	Oral	5
Statistics for data science											
E	MATH-413	MA	Chandak Limnios			4h	2h		Sum	Written	8
Stochastic simulation											
E	MATH-414	MA	Nobile	2h	2h				Win	Written	5
Structural biology											
E	BIO-315	SV	Dal Peraro			2h	2h		Sum	During the semester	4
Systems for data management and data science											
E	CS-460	IN	Ailamaki Kermarrec			2h	2h	2h	Sum	Written	8
Turbulence											
E	ME-467	GM	Schneider			3h	2h		Sum	During the semester	5
Understanding advanced molecular simulation											
E	CH-420	CGC	Smit			2h		1h	Sum	During the semester	4

Master project

	Courses				MP Autumn		MP Spring		Exam Session	Exam	Credit
Language	Code	Section	Teacher	Specialization	e p	l	e	p			
	Projet de master en science et ingénierie computationelles										
	MATH-598	MA	Profs divers		900h			900h	Sum Win	Oral	30

C : Courses, E : Exercice, P : Pratic courses, * : option courses / F : French courses, D : Deutsch courses, E : English Courses / Sum : Summer, Win : Winter