Studies Plan

Science et ingénierie computationelles 2023-24

Block 1

Language	Code	Section	Teacher	Specialization	Master 1			Master 2			Exam Session	Exam	Credit
					c	p	l	e	p				
Advanced numerical analysis													
E	MATH-351	MA	Picasso		2h	2h					Win	Written	5
Algorithms I													
E	CS-250	IN	Kapralov 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
Introduction to multiprocessor architecture													
E	CS-307	IN	Falsafi		2h		1h				Win	During the semester	4
Machine learning													
E	CS-433	IN	Flammarion Jaggi		4h	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				Win	Oral	4
Programming concepts in scientific computing													
E	MATH-458	MA	Anciaux		2h	2h					Win	During the semester	4

Block SHS Master

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

Group 1

Language	Code	Section	Teacher	Specialization	Master 1			Master 2			MP Autumn			MP Spring			Exam Session	Exam	Credit
					c	p	l	e	p	l	e	p	l	e	p			
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

Language	Course	Code	Section	Teacher	Specialization	M1 C	M1 E	M1 P	M2 C	M2 E	M2 P	Exam Session	Exam	Credit
E	Advanced multiprocessor architecture	CS-471	IN	Falsafi		4h						Win	During the semester	6
E	Algorithms II	CS-450	IN	Svensson		4h	3h					Win	Written	8
E	Applied data analysis	CS-401	SC	West		2h		2h				Win	Written	8
E	Artificial neural networks/reinforcement learning	CS-456	IN	Gerstner					2h	2h		Sum	Written	6
E	Atomistic and quantum simulations of materials	MSE-468	MX	Marzari					3h		1h	Sum	During the semester	4
E	Computational linear algebra	MATH-453	MA	Kressner					2h	2h		Sum	Written	5
E	Computational methods in molecular quantum mechanics	CH-452	CGC	Bonella		2h	1h					Win	Oral	4
E	Computational neurosciences: neuronal dynamics	NX-465	NX	Gerstner					2h	2h		Sum	Written	5
E	Deep learning	EE-559	EL	Cavallaro					2h	2h		Sum	During the semester	4
E	Deep learning in biomedicine	CS-502	IN	Brbic		2h	2h	1h				Win	During the semester	6
E	Distributed intelligent systems	ENG-466	SIE						2h	3h		Sum	Oral	5
E	Dynamical system theory for engineers	COM-502	SC						2h	1h		Sum	Written	6
E	Environmental transport phenomena	ENG-420	SIE	Crouzy Porté-Agel		2h	1h					Win	Written	5
E	Foundations of Data Science	COM-406	IN	Gastpar Urbanke		4h	2h					Win	Written	8
E	Geometric computing	CS-457	IN	Pauly		3h		2h				Win	Written	6
E	HPC for numerical methods and data analysis	MATH-505	MA	Grigori		2h	2h					Win	During the semester	5
E	Hydrodynamics	ME-444	GM	Gallaire					2h	2h		Sum	Written	5
E	Image processing II	MICRO-512	MT	Sage Unser Van De Ville					3h			Sum	Written	3
E	Information security and privacy	COM-402	IN	Payer		3h	1h	2h				Win	Written	8
E	Instability	ME-466	GM	Gallaire		2h	1h					Win	Written	3
E	Introduction to electronic structure methods	CH-353	CGC	Röthlisberger		2h	2h					Win	During the semester	4
E	Low-rank approximation techniques	MATH-403	MA			2h	2h					Win	Oral	5
E	Mathematical foundations of signal processing	COM-514	SC			3h	2h					Win	Written	6
E	Mathematical modelling of behavior	MATH-463	MA	Bierlaire		2h	2h					Win	Written	5
E	Mathematics of data: from theory to computation	EE-556	EL	Cevher		3h		3h				Win	Written	6
E	Molecular quantum dynamics	CH-453	CGC	Vanicek					2h	1h		Sum	Oral	3
E	Numerical approximation of PDEs	MATH-451	MA	Buffa					2h	2h		Sum	Written	5

Language	Code	Section	Teacher	Specialization	C	E	P		Semester	Exam Session	Exam	Credit
Numerical flow simulation												
E	ME-474	GM	Boujo		2h	2h			Win		During the semester	5
Numerical integration of stochastic differential equations												
E	MATH-450	MA	Blumenthal				2h	2h	Sum		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
Statistics for data science												
E	MATH-413	MA	Rubin				4h	2h	Sum		Written	8
Stochastic simulation												
E	MATH-414	MA	Nobile		2h	2h			Win		Oral	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	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