

| Code                                                                            | Matières                                            | Enseignants<br>sous réserve<br>de modification                               | Spécialisations*** |   |   |   | Semestres |   |   |   | Crédits | Places | Période<br>des<br>épreuves * | Type<br>examen ** |                            |
|---------------------------------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------|--------------------|---|---|---|-----------|---|---|---|---------|--------|------------------------------|-------------------|----------------------------|
|                                                                                 |                                                     |                                                                              | K                  | L | M | N | c         | e | p | c | e       | p      |                              |                   |                            |
| Groupe "Core courses et options"                                                |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        | 72                           |                   |                            |
| Groupe 1 "Core courses" (choisir 1 cours dans 4 domaines différents au minimum) |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        | min. 32                      |                   |                            |
| Domaine "Artificial Intelligence & Machine learning" (AIML)                     |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| CS-433                                                                          | Machine learning                                    | West                                                                         | K                  |   |   |   | 4         | 2 | 2 |   |         |        | 8                            | H                 | écrit                      |
| CS-439                                                                          | Optimization for machine learning                   | Flammarion/Jaggi                                                             | K                  |   |   |   |           |   |   | 2 | 2       | 1      | 8                            | E                 | écrit                      |
| Domaine "Algorithms & Theoretical Computer Science" (ATCS)                      |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| CS-450                                                                          | Algorithms II                                       | Kapralov                                                                     |                    |   | M |   | 4         | 3 |   |   |         |        | 8                            | H                 | écrit                      |
| Domaine "Computer Architecture & Integrated Systems" (CAIS)                     |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| CS-470                                                                          | Advanced computer architecture                      | Ienne                                                                        |                    | L |   | N |           |   |   | 3 | 2       |        | 8                            | E                 | écrit                      |
| CS-471                                                                          | Advanced multiprocessor architecture                | Falsafi/Lotfi Kamran                                                         |                    | L |   |   | 4         |   | 8 |   |         |        | 8                            | sem A             |                            |
| Domaine "Distributed computing" (DC)                                            |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| CS-438                                                                          | Decentralized systems engineering                   | Borso/Ford                                                                   |                    | L |   | N | 2         | 2 | 2 |   |         |        | 8                            | H                 | écrit                      |
| CS-451                                                                          | Distributed algorithms                              | Guerraoui                                                                    |                    | L | M |   | 2         | 1 | 3 |   |         |        | 8                            | H                 | écrit                      |
| Domaine "Data Management & Information Retrieval" (DMIR)                        |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| CS-401                                                                          | Applied data analysis                               | Brbic                                                                        | K                  |   |   |   | 2         |   | 2 |   |         |        | 8                            | 600               | H<br>écrit<br>sans retrait |
| CS-460                                                                          | Systems for data management and data science        | Ailamaki/Kermarrec                                                           |                    | L |   |   |           |   |   | 2 | 2       | 2      | 8                            | E                 | écrit                      |
| Domaine "Computer Graphics" (CG)                                                |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| CS-440                                                                          | Advanced computer graphics                          | Jakob                                                                        |                    | L | M |   |           |   |   | 2 | 1       | 1      | 8                            | sem P             |                            |
| CS-457                                                                          | Geometric computing (pas donné en 25-26)            | Pauly                                                                        |                    |   | M |   | 3         | 1 | 1 |   |         |        | 8                            | H                 | écrit                      |
| Domaine "Information & Communication Theory" (ICT)                              |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| COM-417                                                                         | Advanced probability and applications               | Skhel                                                                        |                    |   | M |   | 4         | 2 |   |   |         |        | 8                            | A                 | écrit                      |
| COM-406                                                                         | Foundations of data science                         | Gastpar                                                                      |                    |   | M |   | 4         | 2 |   |   |         |        | 8                            | H                 | écrit                      |
| COM-404                                                                         | Information theory and coding                       | Telatar                                                                      |                    |   | M |   | 4         | 2 |   |   |         |        | 8                            | H                 | écrit                      |
| Domaine "Natural Language Processing" (NLP)                                     |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| CS-552                                                                          | Modern natural language processing                  | Bosselut                                                                     | K                  |   |   |   |           |   |   | 3 | 1       | 2      | 8                            | sem P             |                            |
| Domaine "Operating Systems and Networks" (OSNET)                                |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| COM-407                                                                         | Advanced networks                                   | Nikopoloulos                                                                 |                    | L |   |   | 2         | 2 | 2 |   |         |        | 8                            | H                 | écrit                      |
| COM-405                                                                         | Mobile networks                                     | Al Hassanieh                                                                 |                    | L |   |   | 3         | 2 | 2 |   |         |        | 8                            | H                 | écrit                      |
| COM-430                                                                         | Modern digital communications : a hands-on-approach | Chiurtu                                                                      |                    | L |   |   | 2         | 2 |   |   |         |        | 8                            | sem A             |                            |
| CS-522                                                                          | Principles of computer systems                      | Argyaki/Canda                                                                |                    | L |   |   | 4         |   |   |   |         |        | 8                            | sem A             |                            |
| Domaine "Programming Language & Formal Methods" (PLFM)                          |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| CS-550                                                                          | Formal verification                                 | Kuncak                                                                       |                    |   | M | N | 2         | 2 | 2 |   |         |        | 8                            | sem A             |                            |
| CS-428                                                                          | Interactive theorem proving                         | Barriere/Pit-Claudel                                                         |                    |   | M | N |           |   |   | 2 | 1       | 2      | 8                            | sem P             |                            |
| Domaine "Security & Privacy" (SP)                                               |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| CS-523                                                                          | Advanced topics on privacy enhancing technologies   | vacat                                                                        |                    |   |   | N |           |   |   | 3 | 1       | 2      | 8                            | E                 | écrit                      |
| COM-401                                                                         | Cryptography and security                           | Vaudenay                                                                     |                    |   | M | N | 4         | 2 |   |   |         |        | 8                            | H                 | écrit                      |
| COM-402                                                                         | Information security and privacy                    | Payer                                                                        |                    |   |   | N | 3         | 1 | 2 |   |         |        | 8                            | H                 | écrit                      |
| CS-412                                                                          | Software security                                   | Payer                                                                        |                    | L |   | N |           |   |   | 3 | 2       | 1      | 8                            | E                 | écrit                      |
| Groupe 2 "Options"                                                              |                                                     | (la somme des crédits des groupes 1 et 2 doit être de 72 crédits au minimum) |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| - voir liste options                                                            |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        |                              |                   |                            |
| Bloc "Projet et SHS" :                                                          |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        | 18                           |                   |                            |
| CS-498                                                                          | Research project in Computer Science II             | Divers enseignants                                                           |                    |   |   |   |           |   | 2 |   |         | 2      | 12                           | sem A ou P        |                            |
| HUM-nnn                                                                         | SHS : introduction au projet                        | Divers enseignants                                                           |                    |   |   |   | 2         |   | 1 |   |         |        | 3                            | sem A             |                            |
| HUM-nnn                                                                         | SHS : projet                                        | Divers enseignants                                                           |                    |   |   |   |           |   |   |   |         | 3      |                              | sem P             |                            |
| Total des crédits du cycle master :                                             |                                                     |                                                                              |                    |   |   |   |           |   |   |   |         |        | 90                           |                   |                            |

**Remarques :**

\* Cf. l'art. 3 de l'Ordonnance sur le contrôle des études à l'EPFL

\*\* sans retrait = pas de retrait possible après le délai d'inscription

**Stage d'ingénieur :**

Voir les modalités dans le règlement d'application

**\*\*\*Spécialisations**

K : AI &amp; DATA SCIENCE

L : COMPUTER SYSTEMS

M : FOUNDATIONS OF COMPUTING

N : CYBER SECURITY

**Mineurs :**Le cursus peut être complété par un des mineurs figurant dans l'offre de l'EPFL (renseignements à la page [sac.epfl.ch/mineurs](http://sac.epfl.ch/mineurs)), à l'exclusion des mineurs, "Data science", "Cyber security" et "Informatique" qui ne peuvent pas être choisis.

Le choix des cours de tous les mineurs se fait sur conseil de la section de l'étudiant et du responsable du mineur.

**Important:** Ce plan d'études s'applique exclusivement aux étudiant-es débutant le programme Master en Informatique dès l'automne 2025 // This study plan applies exclusively to students beginning the Master's program in Computer Science in Autumn 2025.

| Code               | Matières                                                        | Enseignants<br>sous réserve<br>de modification | Spécialisations |   |   |   | Semestres |   |   |     |   |   | Crédits | Nbre<br>places | Période<br>des<br>épreuves * | Type<br>examen **    |
|--------------------|-----------------------------------------------------------------|------------------------------------------------|-----------------|---|---|---|-----------|---|---|-----|---|---|---------|----------------|------------------------------|----------------------|
|                    |                                                                 |                                                | K               | L | M | N | MA1       |   |   | MA2 |   |   |         |                |                              |                      |
|                    |                                                                 |                                                |                 |   |   |   | c         | e | p | c   | e | p |         |                |                              |                      |
| Groupe 2 "Options" |                                                                 |                                                |                 |   |   |   |           |   |   |     |   |   |         |                |                              |                      |
| CS-420             | Advanced compiler construction                                  | Schinz                                         |                 | L |   |   |           |   |   | 2   |   | 2 | 6       |                | sem P                        |                      |
| COM-501            | Advanced cryptography                                           | Vaudenay                                       |                 |   | M | N |           |   |   | 2   | 2 |   | 6       |                | E                            | écrit                |
| CS-477             | Advanced operating systems                                      | Kashyap                                        |                 | L |   |   | 2         | 1 | 2 |     |   |   | 6       |                | H                            | écrit                |
| CS-500             | AI product management                                           | Kaboli/Zamir                                   | K               |   |   |   | 2         | 2 | 3 |     |   |   | 6       |                | sem A                        | sans retrait         |
| EE-512             | Applied biomedical signal processing                            | Lemay                                          |                 |   |   |   | 2         |   | 2 |     |   |   | 4       |                | H                            | écrit                |
| MATH-493           | Applied biostatistics (pas donné en 25-26)                      | Goldstein                                      |                 |   |   |   |           |   |   | 2   | 2 |   | 5       |                | sem P                        |                      |
| EE-554             | Automatic speech processing                                     | Magimai Doss                                   |                 |   |   |   | 2         | 2 |   |     |   |   | 4       |                | H                            | écrit                |
| MICRO-452          | Basics of mobile robotics                                       | Mondada                                        |                 |   |   |   | 1         |   | 3 |     |   |   | 4       |                | H                            | écrit                |
| MGT-416            | Causal inference ****                                           | Kiyavash                                       |                 |   |   |   |           |   |   | 2   | 1 |   | 4       |                | sem P                        |                      |
| MATH-352           | Causal thinking                                                 | Stensrud                                       |                 |   |   |   | 2         | 2 |   |     |   |   | 5       |                | H                            | écrit                |
| CS-524             | Computational complexity                                        | Göös                                           |                 |   | M |   | 2         | 2 |   |     |   |   | 6       |                | H                            | écrit                |
| NX-465             | Computational neuroscience : neural dynamics                    | Gerstner                                       |                 |   |   |   |           |   |   | 2   | 2 |   | 5       |                | E                            | écrit                |
| CS-442             | Computer vision                                                 | Fua                                            | K               |   |   |   |           |   |   | 2   | 1 |   | 6       |                | E                            | écrit                |
| COM-418            | Computers and Music (pas donné en 25-26)                        | Prandoni                                       |                 |   | M |   |           |   |   | 2   | 1 |   | 6       |                | sem P                        |                      |
| CS-453             | Concurrent computing                                            | Guerraoui                                      |                 | L | M |   | 2         | 1 | 2 |     |   |   | 6       |                | H                            | écrit                |
| COM-480            | Data visualization                                              | Vuillon                                        | K               |   |   |   |           |   |   | 2   |   | 2 | 6       |                | sem P                        |                      |
| EE-559             | Deep learning                                                   | Cavallaro                                      |                 |   |   |   |           |   |   | 2   | 2 |   | 4       | 150            | sem P                        | sans retrait         |
| CS-502             | Deep learning in biomedicine (pas donné en 25-26)               | Brbic                                          | K               |   |   |   |           |   |   | 2   | 2 | 1 | 6       |                | sem P                        |                      |
| CS-456             | Deep reinforcement learning (pas donné en 25-26)                | Gulcehre                                       | K               |   |   |   |           |   |   | 2   | 1 | 1 | 6       |                | E                            | écrit                |
| CS-472             | Design technologies for integrated systems                      | De Micheli/Mallasen/Schiavone                  |                 | L |   |   | 3         |   | 2 |     |   |   | 6       |                | sem A                        |                      |
| CS-411             | Digital education                                               | Dillenbourg/Jermann/Käser                      | K               |   |   |   | 2         |   | 2 |     |   |   | 6       |                | H                            | écrit                |
| CS-423             | Distributed information systems (pas donné en 25-26)            | vacat                                          |                 | L |   |   | 2         | 1 | 1 |     |   |   | 6       |                | H                            | écrit                |
| COM-502            | Dynamical system theory for engineers (pas donné en 25-26) **** | Thiran P.                                      |                 |   | M |   |           |   |   | 3   | 1 |   | 6       |                | E                            | écrit                |
| CS-476             | Embedded systems design                                         | Kluter                                         |                 | L |   |   |           |   |   | 2   |   | 2 | 6       |                | sem P                        |                      |
| DH-415             | Ethics and Law of AI                                            | Rochel                                         |                 |   |   |   | 2         |   | 2 |     |   |   | 4       |                | sem A                        |                      |
| CS-489             | Experience design                                               | Huang                                          | K               |   |   |   | 2         |   | 4 |     |   |   | 6       |                | sem A                        |                      |
| CS-461             | Foundation models and generative AI                             | Bunne                                          | K               |   |   |   | 2         | 1 | 1 |     |   |   | 6       |                | sem A                        |                      |
| CS-459             | Foundations of probabilistic proofs                             | Chiesa                                         |                 |   | M | N | 4         | 1 |   |     |   |   | 6       |                | H                            | écrit                |
| MATH-483           | Gödel and recursivity (pas donné en 25-26)                      | Duparc                                         |                 |   |   |   | 2         | 2 |   |     |   |   | 5       |                | H                            | écrit                |
| MICRO-511          | Image processing I                                              | Unser/Van De Ville                             |                 |   |   |   | 2         | 1 |   |     |   |   | 3       |                | H                            | écrit                |
| MICRO-512          | Image processing II                                             | Unser/Van de Ville/Sage                        |                 |   |   |   |           |   |   | 2   | 1 |   | 3       |                | E                            | écrit                |
| CS-487             | Industrial automation                                           | Tournier/Sommer                                |                 |   |   |   |           |   |   | 2   | 1 |   | 3       | 36             | E                            | oral<br>sans retrait |
| CS-486             | Interaction design                                              | Pu                                             | K               |   |   |   |           |   |   | 2   | 1 | 1 | 6       |                | sem P                        |                      |
| CS-431             | Introduction to natural language processing                     | Rajman/Chappelier/Bosselut                     | K               |   |   |   | 2         | 2 |   |     |   |   | 6       |                | H                            | écrit                |
| COM-440            | Introduction to quantum cryptography                            | Vidick                                         |                 |   | M | N | 3         | 1 |   |     |   |   | 6       |                | H                            | écrit                |
| COM-490            | Large-scale data science for real-world data                    | Bouillet/Delgado/Sarni/Verscheure              | K               |   |   |   |           |   |   |     |   | 4 | 6       |                | sem P                        |                      |
| CS-479             | Learning in neural networks                                     | Gerstner                                       | K               |   |   |   |           |   |   | 2   | 1 | 1 | 6       |                | E                            | oral                 |
| CS-526             | Learning theory                                                 | Macris                                         | K               |   | M |   |           |   |   | 2   | 2 |   | 6       |                | E                            | écrit                |
| CS-421             | Machine learning for behavioral data                            | Käser                                          | K               |   |   |   |           |   |   | 2   |   | 2 | 6       |                | E                            | écrit                |
| MGT-427            | Management de projet et analyse du risque                       | Wieser                                         |                 |   |   |   | 2         |   | 1 |     |   |   | 4       |                | sem A                        | sans retrait         |
| COM-516            | Markov chains and algorithmic applications ****                 | Lévêque/Macris                                 |                 |   | M |   | 2         | 1 | 1 |     |   |   | 6       |                | H                            | écrit                |
| EE-452             | Network machine learning                                        | Frossard/Thanon                                |                 |   |   |   |           |   |   | 2   |   | 2 | 4       |                | sem P                        |                      |
| COM-512            | Networks out of control ****                                    | Thiran P./Grossglauser                         |                 |   | M |   |           |   |   | 2   | 1 |   | 6       |                | E                            | écrit                |
| MATH-489           | Number theory II.d - Cryptography (pas donné en 25-26)          | vacat                                          |                 |   |   |   |           |   |   | 2   | 2 |   | 5       |                | E                            | écrit                |
| CS-596             | Optional research project in computer science II                | Divers enseignants                             |                 |   |   |   |           |   | 2 |     |   | 2 | 8       |                | sem A ou P                   |                      |
| CS-447             | Secure hardware design (pas donné en 25-26)                     | Bourgeat                                       |                 |   |   | N |           |   |   | 2   |   | 4 | 6       |                | sem P                        |                      |
| COM-506            | Student seminar : security protocols and applications           | Vaudenay                                       |                 |   |   | N |           |   |   | 2   |   |   | 3       |                | sem P                        |                      |
| CS-448             | Sublinear algorithms for big data analysis ****                 | Kapralov                                       |                 |   | M |   |           |   |   | 2   | 1 |   | 6       |                | sem P                        |                      |
| CS-473             | System programming for Systems-on-Chip                          | Kluter                                         |                 | L |   |   | 2         | 2 |   |     |   |   | 6       |                | sem A                        |                      |
| CS-510             | Topics in software security (pas donné en 25-26)                | Payer                                          |                 | L |   |   | 1         | 1 |   |     |   |   | 3       |                | sem A                        |                      |
| CS-455             | Topics in theoretical computer science ****                     | Svensson                                       |                 |   | M | N | 3         | 1 |   |     |   |   | 6       |                | sem A                        |                      |
| CS-503             | Visual Intelligence                                             | Zamir                                          | K               |   |   |   |           |   |   | 2   | 1 | 1 | 6       |                | sem P                        |                      |

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\*\*\*\* cours biennaux donnés une année sur deux

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Les enseignants, les crédits et la période des cours sont indiqués sous réserve de modification.

| Code    | Matières                                                     | Enseignants                       | Crédits | Période des cours |   |
|---------|--------------------------------------------------------------|-----------------------------------|---------|-------------------|---|
|         | <b>AIML - Artificial Intelligence &amp; Machine Learning</b> |                                   |         |                   |   |
| CS-500  | AI Product management                                        | Kaboli/Zamir                      | 6       | A                 |   |
| CS-502  | Deep learning in biomedicine                                 | Brbic                             | 6       |                   | P |
| CS-456  | Deep reinforcement learning                                  | Gulcehre                          | 6       |                   | P |
| CS-461  | Foundation models and generative AI                          | Bunne                             | 6       | A                 |   |
| CS-479  | Learning in neural networks                                  | Gerstner                          | 6       |                   | P |
| CS-526  | Learning theory                                              | Macris                            | 6       |                   | P |
| CS-433  | Machine learning                                             | West                              | 8       | A                 |   |
| CS-439  | Optimization for machine learning                            | Flammarion/Jaggi                  | 8       |                   | P |
|         | <b>ATCS - Algorithms &amp; Theoretical Computer Science</b>  |                                   |         |                   |   |
| CS-450  | Algorithms II                                                | Kapralov                          | 8       | A                 |   |
| CS-524  | Computational complexity                                     | Göös                              | 6       | A                 |   |
| CS-453  | Concurrent computing                                         | Guerraoui                         | 6       | A                 |   |
| CS-459  | Foundations of probabilistic proofs                          | Chiesa                            | 6       | A                 |   |
| COM-440 | Introduction to quantum cryptography                         | Vidick                            | 6       | A                 |   |
| CS-448  | Sublinear algorithms for big data analysis                   | Kapralov                          | 6       |                   | P |
| CS-455  | Topics in theoretical computer science                       | Svensson                          | 6       | A                 |   |
|         | <b>CAIS - Computer Architecture &amp; Integrated Systems</b> |                                   |         |                   |   |
| CS-470  | Advanced computer architecture                               | Ienne                             | 8       |                   | P |
| CS-471  | Advanced multiprocessor architecture                         | Falsafi/Lotfi Karman              | 8       | A                 |   |
| CS-472  | Design technologies for integrated systems                   | De Micheli/Mallasen/Schiavone     | 6       | A                 |   |
| CS-476  | Embedded systems design                                      | Kluter                            | 6       |                   | P |
| CS-473  | System programming for Systems-on-Chip                       | Kluter                            | 6       | A                 |   |
|         | <b>CG - Computer Graphics</b>                                |                                   |         |                   |   |
| CS-440  | Advanced computer graphics                                   | Jakob                             | 8       |                   | P |
| CS-457  | Geometric computing                                          | Pauly                             | 8       | A                 |   |
|         | <b>CV - Computer Vision</b>                                  |                                   |         |                   |   |
| CS-442  | Computer vision                                              | Fua                               | 6       |                   | P |
| COM-480 | Data visualization                                           | Vuillon                           | 6       |                   | P |
| CS-503  | Visual intelligence                                          | Zamir                             | 6       |                   | P |
|         | <b>DC - Distributed Computing</b>                            |                                   |         |                   |   |
| CS-438  | Decentralized systems engineering                            | Borso/Ford                        | 8       | A                 |   |
| CS-451  | Distributed algorithms                                       | Guerraoui                         | 8       | A                 |   |
|         | <b>DE - Digital education</b>                                |                                   |         |                   |   |
| CS-411  | Digital education                                            | Dillenbourg/Jermann/Käser         | 6       | A                 |   |
|         | <b>DMIR - Data Management &amp; Information Retrieval</b>    |                                   |         |                   |   |
| CS-401  | Applied data analysis                                        | Brbic                             | 8       | A                 |   |
| CS-423  | Distributed information systems                              | vacat                             | 6       | A                 |   |
| COM-490 | Large-scale data science for real-world data                 | Bouillet/Delgado/Sarni/Verscheure | 6       |                   | P |
| CS-460  | Systems for data management and data science                 | Ailamaki/Kerमारrec                | 8       |                   | P |
|         | <b>HCI - Human-Computer Interaction</b>                      |                                   |         |                   |   |
| CS-489  | Experience design                                            | Huang                             | 6       | A                 |   |
| CS-486  | Interaction design                                           | Pu                                | 6       |                   | P |
| CS-421  | Machine learning for behavioral data                         | Käser                             | 6       |                   | P |
|         | <b>ICT - Information &amp; Communication Theory</b>          |                                   |         |                   |   |
| COM-417 | Advanced probability and applications                        | Shkel                             | 8       | A                 |   |
| COM-406 | Foundations of data science                                  | Gastpar                           | 8       | A                 |   |
| COM-404 | Information theory and coding                                | Telatar                           | 8       | A                 |   |
| COM-516 | Markov chains and algorithmic applications                   | Lévêque/Macris                    | 6       | A                 |   |
| COM-512 | Networks out of control                                      | Grossglauser/Thiran               | 6       |                   | P |

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2025-2026 **INFORMATIQUE - Domaines** **(Plan d'études réforme dès l'automne 2025)**

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| Code    | Matières                                                 | Enseignants                | Crédits | Période des cours |   |
|---------|----------------------------------------------------------|----------------------------|---------|-------------------|---|
|         | <b>NLP - Natural Language Processing</b>                 |                            |         |                   |   |
| CS-431  | Introduction to natural language processing              | Bosselut/Chappelier/Rajman | 6       | A                 |   |
| CS-552  | Modern natural language processing                       | Bosselut                   | 8       |                   | P |
|         |                                                          |                            |         |                   |   |
|         | <b>OSNET - Operating Systems &amp; Networks</b>          |                            |         |                   |   |
| COM-407 | Advanced networks                                        | Nikolopoulos               | 8       | A                 |   |
| CS-477  | Advanced operating systems                               | Kashyap                    | 6       | A                 |   |
| COM-405 | Mobile networks                                          | Al Hassanieh               | 8       | A                 |   |
| COM-430 | Modern digital communications : A hands-on approach      | Chiurtu                    | 8       | A                 |   |
| CS-522  | Principles of computer systems                           | Argyrazi/Candea            | 8       | A                 |   |
|         |                                                          |                            |         |                   |   |
|         | <b>PLFM - Programming Languages &amp; Formal Methods</b> |                            |         |                   |   |
| CS-420  | Advanced compiler construction                           | Schinz                     | 6       |                   | P |
| CS-550  | Formal verification                                      | Kuncak                     | 8       | A                 |   |
| CS-428  | Interactive theorem proving                              | Barrière/Pit-Claudel       | 8       |                   | P |
|         |                                                          |                            |         |                   |   |
|         | <b>SIP - Signal &amp; Image Processing</b>               |                            |         |                   |   |
| COM-418 | Computers and music                                      | Prandoni                   | 6       |                   | P |
| COM-502 | Dynamical system theory for engineers                    | Thiran                     | 6       |                   | P |
|         |                                                          |                            |         |                   |   |
|         | <b>SP - Security &amp; Privacy</b>                       |                            |         |                   |   |
| COM-501 | Advanced cryptography                                    | Vaudenay                   | 6       |                   | P |
| CS-523  | Advanced topics on privacy enhancing technologies        | vacat                      | 8       |                   | P |
| COM-401 | Cryptography and security                                | Vaudenay                   | 8       | A                 |   |
| COM-402 | Information security and privacy                         | Payer                      | 8       | A                 |   |
| CS-447  | Secure hardware design                                   | Bourgeat                   | 6       |                   | P |
| CS-412  | Software security                                        | Payer                      | 8       |                   | P |
| COM-506 | Student seminar : security protocols and applications    | Vaudenay                   | 3       |                   | P |
| CS-510  | Topics in software security                              | Payer                      | 3       | A                 |   |
|         |                                                          |                            |         |                   |   |

Légende :

A = automne, P = printemps - 1 semestre comprend 14 semaines

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|---------|------------------------------------------------------------|-----------------------------------|------------|-------------------|---|
|         | <b>Spécialisation K : AI &amp; DATA SCIENCE</b>            |                                   | <b>124</b> |                   |   |
| CS-500  | AI product management                                      | Kaboli/Zamir                      | 6          | A                 |   |
| CS-401  | Applied data analysis                                      | Brbic                             | 8          | A                 |   |
| CS-442  | Computer vision                                            | Fua                               | 6          |                   | P |
| COM-480 | Data visualization                                         | Vuillon                           | 6          |                   | P |
| CS-502  | Deep learning in Biomedicine (pas donné en 25-26)          | Brbic                             | 6          |                   | P |
| CS-456  | Deep reinforcement learning (pas donné en 25-26)           | Gulcehre                          | 6          |                   | P |
| CS-411  | Digital education                                          | Dillenbourg/Jermann/Käser         | 8          | A                 |   |
| CS-489  | Experience design                                          | Huang                             | 6          | A                 |   |
| CS-461  | Foundation models and generative AI                        | Bunne                             | 6          | A                 |   |
| CS-486  | Interaction design                                         | Pu                                | 6          |                   | P |
| CS-431  | Introduction to natural language processing                | Bosselut/Chappelier/Rajman        | 6          | A                 |   |
| COM-490 | Large-scale data science for real-world data               | Bouillet/Delgado/Sarni/Verscheure | 6          |                   | P |
| CS-479  | Learning in neural networks                                | Gerstner                          | 6          |                   | P |
| CS-526  | Learning theory                                            | Macris                            | 6          |                   | P |
| CS-433  | Machine learning                                           | West                              | 8          | A                 |   |
| CS-421  | Machine learning for behavioral data                       | Käser                             | 6          |                   | P |
| CS-552  | Modern natural language processing                         | Bosselut                          | 8          |                   | P |
| CS-439  | Optimization for machine learning                          | Flammarion/Jaggi                  | 8          |                   | P |
| CS-503  | Visual intelligence                                        | Zamir                             | 6          |                   | P |
|         |                                                            |                                   |            |                   |   |
|         | <b>Spécialisation L : COMPUTER SYSTEMS</b>                 |                                   | <b>133</b> |                   |   |
| CS-420  | Advanced compiler construction                             | Schinz                            | 6          |                   | P |
| CS-470  | Advanced computer architecture                             | Ienne                             | 8          |                   | P |
| CS-440  | Advanced computer graphics                                 | Jakob                             | 8          |                   | P |
| CS-471  | Advanced multiprocessor architecture                       | Falsafi/Lotfi Karman              | 8          | A                 |   |
| COM-407 | Advanced networks                                          | Nikolopoulos                      | 8          | A                 |   |
| CS-477  | Advanced operating systems                                 | Kashyap                           | 6          | A                 |   |
| CS-453  | Concurrent computing                                       | Guerraoui                         | 6          | A                 |   |
| CS-438  | Decentralized systems engineering                          | Borso/Ford                        | 8          | A                 |   |
| CS-472  | Design technologies for integrated systems                 | De Micheli/Mallasen/Schiavone     | 6          | A                 |   |
| CS-451  | Distributed algorithms                                     | Guerraoui                         | 8          | A                 |   |
| CS-423  | Distributed information systems (pas donné en 25-26)       | vacat                             | 6          | A                 |   |
| CS-476  | Embedded systems design                                    | Kluter                            | 6          |                   | P |
| COM-405 | Mobile networks                                            | Al Hassanieh                      | 8          | A                 |   |
| COM-430 | Modern digital communications : a hands on approach        | Chiurtu                           | 8          | A                 |   |
| CS-522  | Principles of computer systems                             | Argyrazi/Candea                   | 8          | A                 |   |
| CS-412  | Software security                                          | Payer                             | 8          |                   | P |
| CS-473  | System programming for Systems-on-chip                     | Kluter                            | 6          | A                 |   |
| CS-460  | Systems for data management and data science               | Ailamaki/Kermarrec                | 8          |                   | P |
| CS-510  | Topics in software security (pas donné en 25-26)           | Payer                             | 3          | A                 |   |
|         |                                                            |                                   |            |                   |   |
|         | <b>Spécialisation M : FOUNDATIONS OF COMPUTING</b>         |                                   | <b>155</b> |                   |   |
| CS-440  | Advanced computer graphics                                 | Jakob                             | 8          |                   | P |
| COM-501 | Advanced cryptography                                      | Vaudenay                          | 6          |                   | P |
| COM-417 | Advanced probability and applications                      | Shkel                             | 8          | A                 |   |
| CS-450  | Algorithms II                                              | Kapralov                          | 8          | A                 |   |
| COM-418 | Computers and music (pas donné en 25-26)                   | Prandoni                          | 6          |                   | P |
| CS-524  | Computational complexity                                   | Göös                              | 6          | A                 |   |
| CS-453  | Concurrent computing                                       | Guerraoui                         | 6          | A                 |   |
| COM-401 | Cryptography and security                                  | Vaudenay                          | 8          | A                 |   |
| CS-451  | Distributed algorithms                                     | Guerraoui                         | 8          | A                 |   |
| COM-502 | Dynamical system theory for engineers (pas donné en 25-26) | Thiran                            | 6          |                   | P |
| CS-550  | Formal verification                                        | Kuncak                            | 8          | A                 |   |
| COM-406 | Foundations of data science                                | Gastpar                           | 8          | A                 |   |
| CS-459  | Foundations of probabilistic proofs                        | Chiesa                            | 6          | A                 |   |
| CS-457  | Geometric computing (pas donné en 25-26)                   | Pauly                             | 8          | A                 |   |
| COM-404 | Information theory and coding                              | Telatar                           | 8          | A                 |   |
| CS-428  | Interactive theorem proving                                | Barrière/Pit-Claudel              | 8          |                   | P |
| COM-440 | Introduction to quantum cryptography                       | Vidick                            | 6          | A                 |   |
| CS-526  | Learning theory                                            | Macris                            | 6          |                   | P |
| COM-516 | Markov chains and algorithmic applications                 | Lévêque/Macris                    | 6          | A                 |   |
| COM-512 | Networks out of control                                    | Grossglauser/Thiran               | 6          |                   | P |
| COM-506 | Student seminar : security protocols and applications      | Vaudenay                          | 3          |                   | P |
| CS-448  | Sublinear algorithms for big data analysis                 | Kapralov                          | 6          |                   | P |
| CS-455  | Topics in theoretical computer science                     | Svensson                          | 6          | A                 |   |

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|---------|-------------------------------------------------------|----------------------|-----------|-------------------|---|
|         | <b>Spécialisation N : CYBER SECURITY</b>              |                      | <b>94</b> |                   |   |
| CS-470  | Advanced computer architecture                        | Ienne                | 8         |                   | P |
| COM-501 | Advanced cryptography                                 | Vaudenay             | 6         |                   | P |
| CS-523  | Advanced topics on privacy enhancing technologies     | vacat                | 8         |                   | P |
| COM-401 | Cryptography and security                             | Vaudenay             | 8         | A                 |   |
| CS-438  | Decentralized systems engineering                     | Borso/Ford           | 8         | A                 |   |
| CS-550  | Formal verification                                   | Kuncak               | 8         | A                 |   |
| CS-459  | Foundations of probabilistic proofs                   | Chiesa               | 6         | A                 |   |
| COM-402 | Information security and privacy                      | Payer                | 8         | A                 |   |
| CS-428  | Interactive theorem proving                           | Barrière/Pit-Claudel | 8         |                   | P |
| COM-440 | Introduction to quantum cryptography                  | Vidick               | 6         | A                 |   |
| CS-447  | Secure hardware design (pas donné en 25-26)           | Bourgeat             | 6         |                   | P |
| CS-412  | Software security                                     | Payer                | 8         |                   | P |
| COM-506 | Student seminar : security protocols and applications | Vaudenay             | 3         |                   | P |
| CS-510  | Topics in software security (pas donné en 25-26)      | Payer                | 3         | A                 |   |
|         |                                                       |                      |           |                   |   |

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