

The French text of this document (see next page) shall be deemed the authentic version, the English translation being intended for information purposes only.

2020-2021

**Systems Engineering
Interdisciplinary Minor**

**Management of Technology Section
Minor Advisor : Prof. Th. Weber**

Lecturers, credits and course periods are subject to change

102 credits

Courses already taken within the frame of the bachelor or master cannot be taken a second time in a minor

| Codes | Courses | Lecturers | Course catalogue | Credits | Semester | |
|---|--|---------------------------|------------------|---------|----------|---|
| CORE COURSES | | | | | | |
| MICRO-570 | Advanced machine learning | Billard | MT | 4 | | S |
| MICRO-455 | Applied machine learning | Billard | MT | 4 | A | |
| MGT-484 | Applied probability & stochastic processes | Kiyavash | MTE | 4 | A | |
| COM-502 | Dynamical system theory for engineers | Thiran P. | SC | 4 | A | |
| ENG-421 | Fundamentals in systems engineering | 1) de Weck | EL | 5 | A | |
| MATH-265 | Introduction to optimization and operations research | Bierlaire | GC | 3 | A | |
| MGT-448 | Statistical inference and machine learning | 2) Kiyavash | MTE | 4 | A | |
| DOMAIN-SPECIFIC COURSES | | | | | | |
| Industrial engineering | | | | | | |
| ME-416 | Fundamentals of computer aided manufacturing | Kyritsis | GM | 5 | A | |
| ME-516 | Lifecycle performance of product systems | Kyritsis/Friot | GM | 3 | | S |
| Operations research | | | | | | |
| MGT-528 | Operations: economics & strategy | Weber | MTE | 4 | A | |
| MGT-483 | Optimal decision making | Kuhn | MTE | 4 | | S |
| MGT-526 | Supply chain management | Seifert | MTE | 4 | | S |
| Space systems engineering | | | | | | |
| EE-584 | Spacecraft design and system engineering | Richard | EL | 4 | A | |
| Energy and process systems engineering | | | | | | |
| ME-451 | Advanced energetics | Maréchal | GM | 5 | A | |
| ME-454 | Modelling and optimization of energy systems | Maréchal | GM | 4 | | S |
| Systems biology | | | | | | |
| BIO-463 | Genomics and bioinformatics | Rougemont | SV | 4 | | S |
| BIO-341 | Systèmes dynamiques en biologie | Naef | SV | 4 | A | |
| ChE-411 | Principles and applications of systems biology | Hatzimanikatis | CGC | 3 | A | |
| Network systems engineering | | | | | | |
| COM-514 | Mathematical foundations of signal processing | Bejar Haro/Simeoni | SC | 6 | A | |
| COM-512 | Networks out of control (not given in 2020-21) | 2) Thiran P./Grossglauser | SC | 4 | | S |
| Control engineering | | | | | | |
| ME-524 | Advanced control systems | Karimi | GM | 3 | | S |
| ME-523 | Commande non linéaire | Müllhaupt | GM | 3 | A | |
| ME-425 | Model predictive control | Jones | GM | 3 | A | |
| ME-421 | System identification | Karimi | GM | 3 | A | |
| Project | | | | | | |
| ENG-422 | Optional project in Systems engineering | Various Lecturers | Various | 8 | A or S | |

Remarks :

- 1) Recommended for everyone
- 2) Given every 2 years

Legend:

A = autumn semester, S = spring semester
1 semester = 14 weeks

Les enseignants, les crédits et la période des cours sont indiqués sous réserve de modifications.
 Les cours déjà suivis au bachelors ou au master ne peuvent pas être repris dans le mineur.

102 crédits offerts

| Codes | Matières | Enseignants | Livret des cours | Crédits | Période des cours | |
|---|--|---------------------------|------------------|---------|-------------------|---|
| CORE COURSES | | | | | | |
| MICRO-570 | Advanced machine learning | Billard | MT | 4 | | P |
| MICRO-455 | Applied machine learning | Billard | MT | 4 | A | |
| MGT-484 | Applied probability & stochastic processes | Kiyavash | MTE | 4 | A | |
| COM-502 | Dynamical system theory for engineers | Thiran P. | SC | 4 | A | |
| ENG-421 | Fundamentals in systems engineering | 1) de Weck | EL | 5 | A | |
| MATH-265 | Introduction to optimization and operations research | Bierlaire | GC | 3 | A | |
| MGT-448 | Statistical inference and machine learning | 2) Kiyavash | MTE | 4 | A | |
| DOMAIN-SPECIFIC COURSES | | | | | | |
| Industrial engineering | | | | | | |
| ME-416 | Fundamentals of computer aided manufacturing | Kyritsis | GM | 5 | A | |
| ME-516 | Lifecycle performance of product systems | Kyritsis/Friot | GM | 3 | | P |
| Operations research | | | | | | |
| MGT-528 | Operations: economics & strategy | Weber | MTE | 4 | A | |
| MGT-483 | Optimal decision making | Kuhn | MTE | 4 | | P |
| MGT-526 | Supply chain management | Seifert | MTE | 4 | | P |
| Space systems engineering | | | | | | |
| EE-584 | Spacecraft design and system engineering | Richard | EL | 4 | A | |
| Energy and process systems engineering | | | | | | |
| ME-451 | Advanced energetics | Maréchal | GM | 5 | A | |
| ME-454 | Modelling and optimization of energy systems | Maréchal | GM | 4 | | P |
| Systems biology | | | | | | |
| BIO-463 | Genomics and bioinformatics | Rougemont | SV | 4 | | P |
| BIO-341 | Systèmes dynamiques en biologie | Naef | SV | 4 | A | |
| ChE-411 | Principles and applications of systems biology | Hatzimanikatis | CGC | 3 | A | |
| Network systems engineering | | | | | | |
| COM-514 | Mathematical foundations of signal processing | Bejar Haro/Simeoni | SC | 6 | A | |
| COM-512 | Networks out of control (pas donné en 2020-21) | 2) Thiran P./Grossglauser | SC | 4 | | P |
| Control engineering | | | | | | |
| ME-524 | Advanced control systems | Karimi | GM | 3 | | P |
| ME-523 | Commande non linéaire | Müllhaupt | GM | 3 | A | |
| ME-425 | Model predictive control | Jones | GM | 3 | A | |
| ME-421 | System identification | Karimi | GM | 3 | A | |
| Project | | | | | | |
| ENG-422 | Optional project in Systems engineering | Divers enseignants | Divers | 8 | A ou P | |

Remarques :

- 1) Recommandé pour tous
- 2) Donné chaque 2 ans

Légende :

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