## Plan d'études

# Génie mécanique 2023-24

**Bloc "Projets"**

| | Cours | | | | Master 1 | | Master 2 | | | Session Examen | Examen | Crédits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| lang ens. | Code | Sections | Enseignants | Spécialisation | c | p | c | e | p | | | |
| | **Projet Génie mécanique I** | | | | | | | | | | | |
| | ME-401 | GM | Profs divers | | | 2h | | | 2h | Eté Hiv | Pendant le semestre | 10 |
| | **SHS : Introduction au projet** | | | | | | | | | | | |
| | | SHS | | | | | | | | Hiv | | 3 |
| | **SHS : Projet** | | | | | | | | | | | |
| | | SHS | | | | | | | | Eté | | 3 |

**Groupe "Options reconnus SGM"**

| | Cours | | | | Master 1 | | Master 2 | | | Session Examen | Examen | Crédits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| lang ens. | Code | Sections | Enseignants | Spécialisation | c | p | c | e | p | | | |
| | **Advanced additive manufacturing technologies** | | | | | | | | | | | |
| E | MICRO-413 | MT | Brugger Moser | | | | 2h | | 1h | Eté | Oral | 3 |
| | **Advanced composites in engineering structures** | | | | | | | | | | | |
| E | CIVIL-443 | AR | Vassilopoulos | | 2h | 1h | | | | Hiv | Oral | 3 |
| | **Advanced machine learning** | | | | | | | | | | | |
| E | MICRO-570 | MT | | | | | 3h | 1h | 1h | Eté | Oral | 4 |
| | **Advanced satellite positioning** | | | | | | | | | | | |
| E | ENV-542 | SIE | | | | | 2h | 2h | | Eté | Pendant le semestre | 4 |
| | **Applied machine learning** | | | | | | | | | | | |
| E | MICRO-455 | MT | Billard | | 4h | | | | | Hiv | Ecrit | 4 |
| | **Assembly techniques** | | | | | | | | | | | |
| E | MSE-464 | MX | Leinenbach Plummer | | | | 2h | | | Eté | Pendant le semestre | 2 |
| | **Basics of mobile robotics** | | | | | | | | | | | |
| E | MICRO-452 | MT | Mondada | | 2h | 2h | | | | Hiv | Ecrit | 4 |
| | **Basics of robotics for manipulation** | | | | | | | | | | | |
| E | MICRO-450 | MT | Bouri | | 3h | | | | | Hiv | Ecrit | 3 |
| | **Biophysics : physics of biological systems** | | | | | | | | | | | |
| E | PHYS-302 | PH | Rahi | | 2h | 2h | | | | Hiv | Pendant le semestre | 4 |
| | **Biophysics : physics of the cell** | | | | | | | | | | | |
| E | PHYS-301 | PH | Manley | | | | 2h | 1h | | Eté | Ecrit | 3 |
| | **Capteurs** | | | | | | | | | | | |
| F | MICRO-330 | MT | Boero Shea | | | | 5h | | | Eté | Ecrit | 5 |
| | **Commande embarquée de moteurs** | | | | | | | | | | | |
| F | MICRO-510 | MT | Hodder Köchli Perriard | | 1h | 2h | | | | Hiv | Oral | 3 |
| | **Composites polymères + TP** | | | | | | | | | | | |
| F | MSE-340 | MX | Bourban Michaud | | 2h | 2h | | | | Hiv | Oral | 4 |
| | **Composites technology** | | | | | | | | | | | |
| E | MSE-440 | MX | Bourban Michaud Wakeman | | 2h | 1h | | | | Hiv | Pendant le semestre | 3 |
| | **Computational motor control** | | | | | | | | | | | |
| E | CS-432 | SV | Ijspeert | | | | 2h | 2h | | Eté | Pendant le semestre | 4 |
| | **Computer simulation of physical systems I** | | | | | | | | | | | |
| E | PHYS-403 | PH | Pasquarello | | 2h | 2h | | | | Hiv | Oral | 4 |
| | **Convex optimization** | | | | | | | | | | | |
| E | MGT-418 | MTE | Kuhn | | 2h | 2h | | | | Hiv | Ecrit | 5 |
| | **Corrosion et protection des métaux + TP** | | | | | | | | | | | |
| F | MSE-311 | MX | Igual Muñoz Mischler | | | | 2h | | 1h | Eté | Oral | 3 |



C : Cours, E : Exercice, P : Cours pratiques, * : cours à option / F : cours en Français, D : cours en Allemand, E : cours en Anglais / Eté : Eté, Hiv : Hiver

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| | **Déformations des matériaux** | | | | | | | | | | |
| *F* | *MSE-310* | *MX* | *Logé* | 3h | 1h | | | | *Hiv* | *Oral* | *4* |
| | **Distributed intelligent systems** | | | | | | | | | | |
| *E* | *ENG-466* | *SIE* | | | | 2h | 3h | | *Eté* | *Oral* | *5* |
| | **Dynamical system theory for engineers** | | | | | | | | | | |
| *E* | *COM-502* | *SC* | | | | 2h | 1h | | *Eté* | *Ecrit* | *6* |
| | **Energy and comfort in buildings** | | | | | | | | | | |
| *E* | *ENG-445* | *GC* | *Licina Sonta* | 2h | 1h | | | | *Hiv* | *Pendant le semestre* | *4* |
| | **Energy geostructures** | | | | | | | | | | |
| *E* | *CIVIL-444* | *GC* | *Laloui* | | | 2h | 1h | | *Eté* | *Ecrit* | *4* |
| | **Environmental transport phenomena** | | | | | | | | | | |
| *E* | *ENG-420* | *SIE* | *Crouzy Porté-Agel* | 2h | 1h | | | | *Hiv* | *Ecrit* | *5* |
| | **Imaging optics** | | | | | | | | | | |
| *E* | *MICRO-421* | *MT* | *Psaltis* | | | 2h | 1h | | *Eté* | *Pendant le semestre* | *3* |
| | **Industrial automation** | | | | | | | | | | |
| *E* | *CS-487* | *SC* | *Sommer Tournier* | | | 2h | | 1h | *Eté* | *Oral* | *3* |
| | **Innovation & entrepreneurship in engineering** | | | | | | | | | | |
| *E* | *MGT-555* | *MTE* | *Michaud Weber* | 2h | 8h | | | | *Hiv* | *Pendant le semestre* | *10* |
| | **Laser microprocessing** | | | | | | | | | | |
| *E* | *MICRO-520* | *MT* | *Hoffmann* | | | 2h | | | *Eté* | *Oral* | *2* |
| | **Legged robots** | | | | | | | | | | |
| *E* | *MICRO-507* | *MT* | *Ijspeert* | 2h | 2h | | | | *Hiv* | *Pendant le semestre* | *4* |
| | **Life cycle engineering of polymers** | | | | | | | | | | |
| *E* | *MSE-430* | *MX* | *Leterrier* | 2h | | | | | *Hiv* | *Pendant le semestre* | *2* |
| | **Machine learning programming** | | | | | | | | | | |
| *E* | *MICRO-401* | *MT* | *Billard* | | 2h | | | | *Hiv* | *Pendant le semestre* | *2* |
| | **Materials selection** | | | | | | | | | | |
| *E* | *MSE-474* | *MX* | *Michler Vaucher* | | | 2h | | | *Eté* | *Ecrit* | *2* |
| | **Nonlinear analysis of structures** | | | | | | | | | | |
| *E* | *CIVIL-449* | *GC* | *Beyer Lignos Saloustros* | 3h | 2h | | | | *Hiv* | *Ecrit* | *6* |
| | **Numerical approximation of PDEs** | | | | | | | | | | |
| *E* | *MATH-451* | *MA* | *Buffa* | | | 2h | 2h | | *Eté* | *Ecrit* | *5* |
| | **Numerical methods for conservation laws** | | | | | | | | | | |
| *E* | *MATH-459* | *MA* | *Licht* | 2h | 2h | | | | *Hiv* | *Oral* | *5* |
| | **Physiologie par systèmes** | | | | | | | | | | |
| *F* | *BIO-377* | *SV* | *Roy* | | | 3h | 1h | | *Eté* | *Ecrit* | *4* |
| | **Recycling of materials** | | | | | | | | | | |
| *E* | *MSE-463* | *MX* | *Leterrier* | | | 2h | | | *Eté* | *Pendant le semestre* | *2* |
| | **Science des polymères** | | | | | | | | | | |
| *F* | *MSE-362* | *MX* | *Görl* | 2h | 1h | | | | *Hiv* | *Ecrit* | *3* |
| | **Selected topics in mechanics of solids and structures** | | | | | | | | | | |
| *E* | *CIVIL-527* | *GC* | | 2h | 1h | | | | *Hiv* | *Oral* | *3* |
| | **Sensors in medical instrumentation** | | | | | | | | | | |
| *E* | *EE-511* | *EL* | *Chételat Ionescu* | | | 2h | 1h | | *Eté* | *Ecrit* | *3* |
| | **Space mission design and operations** | | | | | | | | | | |
| *E* | *EE-585* | *EL* | *Nicollier* | | | 2h | | | *Eté* | *Oral* | *2* |
| | **Statique II** | | | | | | | | | | |
| *F* | *CIVIL-224* | *GC* | *Vurpillot* | | | 2h | 2h | | *Eté* | *Ecrit* | *4* |
| | **Surface analysis** | | | | | | | | | | |
| *E* | *MSE-351* | *MX* | *Igual Muñoz Stolichnov* | 2h | 1h | | | | *Hiv* | *Ecrit* | *3* |
| | **Systèmes embarqués microprogrammés** | | | | | | | | | | |
| *F* | *EE-310* | *EL* | *Atienza Alonso* | 2h | 2h | | | | *Hiv* | *Oral* | *4* |
| | **Thermodynamics of comfort in buildings** | | | | | | | | | | |
| *E* | *CIVIL-450* | *GC* | | | | 1h | 2h | | *Eté* | *Pendant le semestre* | *3* |



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| | **Tribology** | | | | | | | | | | | |
| *E* | *MSE-485* | *MX* | *Igual Muñoz Mischler* | 2h | | | | | | *Hiv* | *Pendant le semestre* | *2* |

**Groupe "Options SGM"**

| | ***Cours*** | | | ***Master 1*** | | | ***Master 2*** | | | ***Session Examen*** | ***Examen*** | ***Crédits*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *lang ens.* | *Code* | *Sections* | *Enseignants* | *Spécialisation* | | | *c* | *e* | *p* | | | |
| | **Advanced control systems** | | | | | | | | | | | |
| *E* | *ME-524* | *GM* | *Karimi* | | | | 2h | | 1h | *Eté* | *Ecrit* | *3* |
| | **Advanced energetics** | | | | | | | | | | | |
| *E* | *ME-451* | *GM* | *Maréchal* | 3h | 2h | | | | | *Hiv* | *Oral* | *5* |
| | **Advanced heat transfer** | | | | | | | | | | | |
| *E* | *ME-465* | *GM* | *Haussener* | | | | 2h | 1h | | *Eté* | *Ecrit* | *3* |
| | **Advanced solid mechanics** | | | | | | | | | | | |
| *E* | *ME-437* | *GM* | | 3h | 2h | | | | | *Hiv* | *Pendant le semestre* | *5* |
| | **Aerodynamics** | | | | | | | | | | | |
| *E* | *ME-445* | *GM* | *Mulleners* | 2h | 2h | | | | | *Hiv* | *Ecrit* | *4* |
| | **Aéroélasticité et interaction fluide-structure** | | | | | | | | | | | |
| *F* | *ME-435* | *GM* | *Farhat* | 2h | 1h | | | | | *Hiv* | *Ecrit* | *3* |
| | **Applied mechanical design** | | | | | | | | | | | |
| *E* | *ME-403* | *GM* | *Schiffmann* | 1h | | 4h | | | | *Hiv* | *Pendant le semestre* | *5* |
| | **Biomechanics of the cardiovascular system** | | | | | | | | | | | |
| *E* | *ME-481* | *GM* | *Stergiopulos* | | | | 2h | 1h | | *Eté* | *Ecrit* | *3* |
| | **Biomechanics of the musculoskeletal system** | | | | | | | | | | | |
| *E* | *ME-482* | *GM* | *Pioletti* | | | | 2h | 1h | | *Eté* | *Pendant le semestre* | *5* |
| | **Cavitation et phénomènes d'interface** | | | | | | | | | | | |
| *F* | *ME-462* | *GM* | *Farhat* | 2h | | 1h | | | | *Hiv* | *Oral* | *3* |
| | **Commande non linéaire** | | | | | | | | | | | |
| *F* | *ME-523* | *GM* | *Müllhaupt* | 2h | 1h | | | | | *Hiv* | *Oral* | *3* |
| | **Continuous improvement of manufacturing systems** | | | | | | | | | | | |
| *E* | *ME-498* | *GM* | *Kaboli* | | | | 2h | | 2h | *Eté* | *Pendant le semestre* | *5* |
| | **Data-driven design & fabrication methods** | | | | | | | | | | | |
| *E* | *ME-428* | *GM* | *Hughes* | | | | 2h | | 1h | *Eté* | *Pendant le semestre* | *3* |
| | **Engines and fuel cells** | | | | | | | | | | | |
| *E* | *ME-551* | *GM* | *Van Herle* | 3h | | | | | | *Hiv* | *Ecrit* | *4* |
| | **Experimental methods in engineering mechanics** | | | | | | | | | | | |
| *E* | *ME-412* | *GM* | *Kolinski* | 1h | | 3h | | | | *Hiv* | *Pendant le semestre* | *4* |
| | **Hydraulic turbomachines** | | | | | | | | | | | |
| *E* | *ME-453* | *GM* | *Vagnoni* | 3h | 1h | | | | | *Hiv* | *Ecrit* | *4* |
| | **Hydroacoustique pour aménagements hydroélectriques** | | | | | | | | | | | |
| *F* | *ME-443* | *GM* | *Nicolet* | | | | 2h | | 1h | *Eté* | *Oral* | *3* |
| | **Hydrodynamics** | | | | | | | | | | | |
| *E* | *ME-444* | *GM* | *Gallaire* | | | | 2h | 2h | | *Eté* | *Ecrit* | *5* |
| | **Instability** | | | | | | | | | | | |
| *E* | *ME-466* | *GM* | *Gallaire* | 2h | 1h | | | | | *Hiv* | *Ecrit* | *3* |
| | **Introduction to additive manufacturing** | | | | | | | | | | | |
| *E* | *ME-413* | *GM* | *Boillat Brugger Moser* | 2h | | 1h | | | | *Hiv* | *Ecrit* | *3* |
| | **Introduction to nuclear engineering** | | | | | | | | | | | |
| *E* | *ME-464* | *GM* | *Scolaro* | | | | 2h | | | *Eté* | *Oral* | *2* |
| | **Lifecycle performance of product systems** | | | | | | | | | | | |
| *E* | *ME-516* | *GM* | *Friot* | | | | 2h | 1h | | *Eté* | *Pendant le semestre* | *3* |
| | **Mechanical product design and development** | | | | | | | | | | | |
| *E* | *ME-410* | *GM* | *Paik* | 2h | | 1h | | | | *Hiv* | *Pendant le semestre* | *5* |
| | **Mechanics of slender structures** | | | | | | | | | | | |
| *E* | *ME-411* | *GM* | *Reis* | 3h | | 2h | | | | *Hiv* | *Ecrit* | *5* |
| | **Mechanobiology: how mechanics regulate** | | | | | | | | | | | |

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| | **life** | | | | | | | | | | | | | |
| *E* | *ME-480* | *GM* | *Persat Sakar* | 2h | 1h | | | | | *Hiv* | *Pendant le semestre* | | *3* | |
| | **Micro/Nanomechanical devices** | | | | | | | | | | | | | |
| *E* | *ME-426* | *GM* | *Villanueva* | 2h | 2h | | | | | *Hiv* | *Ecrit* | | *4* | |
| | **Micro/Nano robotics** | | | | | | | | | | | | | |
| *E* | *ME-436* | *GM* | *Sakar* | | | 2h | 1h | | | *Eté* | *Pendant le semestre* | | *3* | |
| | **Modelling and optimization of energy systems** | | | | | | | | | | | | | |
| *E* | *ME-454* | *GM* | *Maréchal* | 2h | 2h | | | | | *Hiv* | *Oral* | | *4* | |
| | **Model predictive control** | | | | | | | | | | | | | |
| *E* | *ME-425* | *GM* | *Jones* | 2h | 2h | | | | | *Hiv* | *Ecrit* | | *4* | |
| | **Multi-agent learning and control** | | | | | | | | | | | | | |
| *E* | *ME-429* | *GM* | *Kamgarpour* | | | 2h | | 1h | | *Eté* | *Pendant le semestre* | | *4* | |
| | **Multivariable control** | | | | | | | | | | | | | |
| *E* | *ME-422* | *GM* | *Ferrari Trecate* | 2h | 2h | | | | | *Hiv* | *Ecrit* | | *4* | |
| | **Nano-scale heat transfer** | | | | | | | | | | | | | |
| *E* | *ME-469* | *GM* | *Tagliabue* | | | 2h | 1h | 1h | | *Eté* | *Pendant le semestre* | | *4* | |
| | **Networked control systems** | | | | | | | | | | | | | |
| *E* | *ME-427* | *GM* | *Ferrari Trecate* | 2h | 1h | | | | | *Hiv* | *Ecrit* | | *3* | |
| | **Numerical flow simulation** | | | | | | | | | | | | | |
| *E* | *ME-474* | *GM* | *Boujo* | 2h | 2h | | | | | *Hiv* | *Pendant le semestre* | | *5* | |
| | **Numerical methods in biomechanics** | | | | | | | | | | | | | |
| *E* | *ME-484* | *GM* | *Terrier* | | | 2h | 1h | | | *Eté* | *Ecrit* | | *3* | |
| | **Production management** | | | | | | | | | | | | | |
| *E* | *ME-419* | *GM* | *Kaboli* | 2h | | 2h | | | | *Hiv* | *Pendant le semestre* | | *5* | |
| | **Projet Génie mécanique II** | | | | | | | | | | | | | |
| | *ME-402* | *GM* | *Profs divers* | | | 2h | | 2h | | *Eté Hiv* | *Pendant le semestre* | | *10* | |
| | **Renewable energy (for ME)** | | | | | | | | | | | | | |
| *E* | *ME-460* | *GM* | *Haussener Van Herle* | | | 2h | 1h | | | *Eté* | *Ecrit* | | *4* | |
| | **Solar energy conversion** | | | | | | | | | | | | | |
| *E* | *ME-468* | *GM* | *Haussener* | 2h | 1h | 1h | | | | *Hiv* | *Ecrit* | | *4* | |
| | **System identification** | | | | | | | | | | | | | |
| *E* | *ME-421* | *GM* | *Karimi* | | | 2h | | 1h | | *Eté* | *Ecrit* | | *3* | |
| | **Thermal power cycles and heat pump systems** | | | | | | | | | | | | | |
| *E* | *ME-459* | *GM* | *Schiffmann Van Herle* | | | 2h | 1h | | | *Eté* | *Ecrit* | | *3* | |
| | **Turbulence** | | | | | | | | | | | | | |
| *E* | *ME-467* | *GM* | *Schneider* | | | 3h | 2h | | | *Eté* | *Pendant le semestre* | | *5* | |
| | **Two-phase flows and heat transfer** | | | | | | | | | | | | | |
| *E* | *ME-446* | *GM* | *Lu* | 2h | 1h | | | | | *Hiv* | *Ecrit* | | *3* | |

**Projet de Master**

| | ***Cours*** | | | ***Master 1*** | | | ***Master 2*** | | | ***PDM Automne*** | | | ***PDM Printemps*** | | | ***Session Examen*** | ***Examen*** | ***Crédits*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *lang ens.* | *Code* | *Sections* | *Enseignants* | *Spécialisation* | | | | | | | | | | | | | | |
| | **Projet de master en génie mécanique** | | | | | | | | | | | | | | | | | |
| | *ME-599* | *GM* | *Profs divers* | | | | | | | | | 900h | | | 900h | *Eté Hiv* | *Oral* | *30* |
| | **Stage d'ingénierie crédité avec le PDM (master en Génie mécanique)** | | | | | | | | | | | | | | | | | |
| *F* | *ME-597* | *GM* | *Profs divers* | | | 320h | | | 320h | | | 320h | | | 320h | *Eté Hiv* | *Mémoire* | *0* |