

CREATE THE CHANGE, DESIGN THE FUTURE

SCEAUX | TROYES | MONTPELLIER



STUDY PROGRAM



AERONAUTICS & SPACE



STRUCTURES & MATERIALS ENGINEERING



ENGINEERING & DIGITAL TECHNOLOGIES



ENGINEERING & MANAGEMENT



ENGINEERING & HEALTH



ENERGY & ENVIRONMENT ENGINEERING



BUILDINGS & ECO-CITIES



MASTER OF SCIENCE INNOVATION,
CREATION & ENTREPRENEURSHIP

EPF ENGINEER,
GLOBAL ENGINEER

GENERAL ENGINEERING

For 1st, 2nd and 3rd years, the number of hours includes Lectures (L), Tutorials (T), Lab Work (LW) and projects. These figures do not include individual study work dedicated to projects. Students with a STI2D baccalauréat will have to attend a dedicated preparatory course at the Montpellier campus.

1st YEAR - UNDERGRADUATE DEGREE / PREPARATORY COURSE 1 (60 ECTS*) 703 hours including 161 hours LW/ project

Mathematics applied to engineering	188 h including 13 h LW/ Project	14 ECTS
Abstraction in Mathematics	79 h	
Mathematical tools for engineers	98 h	
Computational techniques	11 h	
Labwork (including MATLAB)	13 h	
Physical Sciences	215 h including 38 h LW/ Project	13 ECTS
Signals and physical systems	33 h	
Optics	8 h	
Electrical circuits	73 h	
Electromagnetism	37 h	
Thermodynamics	33 h	
Chemistry	31 h	
Physics Labwork (Signals, Optics, Electrics, Chemistry, Electromagnetism, Mechanics, Simulation, Thermodynamics)		
Sciences applied to Engineering	111 h including 35 h LW/ project	11 ECTS
Systems analysis and mechanical technology	44 h	
Introduction to digital engineering (CATIA)	16 h	
General Mechanics	40 h	
Engineer's science project	11 h	
Information and Communication Technologies	84 h including 54 h LW/ project	10 ECTS
Information and Communication Technologies intense week	22 h	
WEB project	(24 hours including 16 hours for Project)	
Algorithmic	(38 hours including 12 hours for Project)	
Human and Social Sciences	105 h including 6 h for Project	12 ECTS
Personal project	6 h	
Office automation (e-learning)	1 h	
Managing an association (supervised by Grands Associatifs alumni)	3 h	
Business understanding	11 h	
Innovation challenge	6 h	
Foreign languages	78 h	

4-week technical internship

2nd YEAR - UNDERGRADUATE DEGREE / PREPARATORY COURSE 2 (60 ECTS) 771 hours including 157 hours LW/ project

Mathematics applied to engineering	163 h including 8 h LW/ Project	13 ECTS
Abstraction in Mathematics	78 h	
Mathematical tools for engineers	64 h	
Probability and statistics	21 h	
MATLAB LW	8 h	
Physical Sciences	205 h including 27 h LW/ Project	13 ECTS
Electromagnetism	63 h	
Signals and physical systems	30 h	
Analogue electronics	33 h	
Thermodynamics	24 h	
Fluid mechanics	29 h	
Chemistry	26 h	
Physics Labwork (Electromagnetism, Electronics, Chemistry, Thermodynamics)	27 h	
Sciences applied to Engineering	209 h including 63 h LW/ project	13 ECTS
Mechanical technology	30 h	
Systems engineering (CATIA)	16 h	
General Mechanics	48 h	
Systems control	59 h	
Digital electronics	29 h	
Innovation project	11 h (supervised)	
Mechatronics project	16 h (supervised)	
Information and Communication Technologies	90 h including 59 h LW/ project	10 ECTS
Object-oriented design and programming	67 h	
Modelling	6 h	
Information protection	4 h	
Database	8 h	
Architecture of IT systems	5 h	
Human and Social Sciences	104 h	9 ECTS
Technical internship	2 h	
Corporate law	12 h	
Intellectual property law	12 h	
Foreign languages	78 h	

6-week civic engagement

3rd YEAR - UNDERGRADUATE DEGREE / ENGINEER 1 (60 ECTS)

762 hours including 301 hours LW/ project

Modelling, digital resolution and optimisation tools	65 h including 26 h LW	7 ECTS
Digital analysis for engineers Applied statistics and probability for engineers		
Communication systems and regulation	99 h including 20 h LW	7 ECTS
Transmission systems Measuring systems and signal processing Controlling systems		
Mechanical Dimensioning	85 h including 18 h LW	7 ECTS
Materials Continuum mechanics, resistance of materials Fluid Mechanics		
Opening, business and human and social sciences	47 h	3 ECTS
Business understanding Professional project workshops Choice of opening courses (Astronomy, engineering and health, design, artistic creation, introduction to quantum physics, engineering and drama, gender equality in the workplace, climate change, etc.)		
Information and Communication Technologies	44 h including 16 h LW	4 ECTS
Networks Information systems for businesses Information protection Information promotion VBA and MySQL programming (database)		
Energy	75 h including 12 h LW	5 ECTS
Thermodynamics applied to engineering Electric converters Thermal transfers		
Organic chemistry and Biology	62 h	5 ECTS
Materials chemistry Biochemistry Biomedical engineering		
Contextualised project	144 h	5 ECTS
Choice of a supervised project preparing to 4th Year internship		
Systems engineering project (CATIA, DYMOLA)	59 h including 48 h LW)	9 ECTS
Foreign languages (English + 2nd foreign language)	78 h	8 ECTS

4th AND 5th YEARS - MASTER'S DEGREE (120 ECTS)

4th Year	5th Year	
Semester 7 Engineering student internship or semester studying abroad	Semester 9 Major/semester studying abroad	Semester 9 ICE Master 1st semester
Semester 8 Major/ semester studying abroad	Semester 10 End-of-studies project	Semester 10 ICE Master 2nd semester

In Year 4, all students attend one of the 7 career-oriented majors at Sceaux, Troyes or Montpellier. Majors consist in a two-academic year program and focus on two academic semesters as well as two semesters of internships.

- Engineering Student Internship in S7 (minimum of 15 weeks)
- "End-of-Studies Project" Internship in S10 (21 to 26 weeks)

Each student can entirely personalize his/ her curriculum through a system consisting in compulsory and elective courses and thus define his/ her engineer profile according to his/ her professional project. "Engineering & Management" and "Energy & Environment Engineering" majors also offer a curriculum entirely delivered in English, for those who wish to attend them.

In Year 5, students may also enter the Master of Science Innovation, Creation and Entrepreneurship (ICE) or join one the schools or universities who are partners of the EPF, either in France or abroad, in order to complete a double master's degree.

Majors by campus:

Sceaux

- Aeronautics and Space
- Structures and Materials
- Engineering & Digital Technologies
- Engineering & Management
- Engineering & Health

Montpellier

- Energy & Environment

Troyes

- Building & Eco-cities

MAJORS



AERONAUTICS & SPACE MAJOR

COMPULSORY CUs - 4th YEAR	HOURS	ECTS
Tools for engineers	80 h	6
Labour law		
Business Game		
Project management		
Statistics for engineers		
English		
Knowledge of the industry sector	80 h	6
Introduction to the aeronautics industry		
Introduction to the space industry		
Aeronautics and space industry economy and market		
Aeronautics and space industry careers		
The French / European / global industry		
Systems approach	80 h	6
Complex systems engineering		
Life Cycle Analysis		
Aircraft systems		
Launcher systems		
Helicopter, satellite, drone systems		
Applied mechanics	80 h	6
Space mechanics		
Flight mechanics		
Basic aerodynamics		
Sizing a structure with FEM		
Composite materials		
Project	150 h	6
COMPULSORY CUs - 5th YEAR	HOURS	ECTS
Systems design	80 h	6
Constraints on board		
Flight controls		
Avionics		
Guidance-Navigation-Control		
On-board energy	80 h	6
Aircraft electrical systems		
Launcher electrical systems		
Satellite electrical systems		
Spacecraft propulsion (liquid, solid, electrical)		
Aircraft propulsion		
Project	150 h	6
ELECTIVE CUs - 5th YEAR - 2 TO BE CHOSEN	HOURS	ECTS
Operation	80 h	6
Aircraft operation		
Spacecraft operation		
Air legislation and certification		
Space legislation and certification		
Satellite operation		
Maintenance	80 h	6
Associated nomenclature		
Aircraft maintenance cycles		
The aircraft maintenance market		
Integrated logistics support		
Operational readiness		
Industrialisation	80 h	6
Factory 4.0		
Configuration management		
Quality		
Standards / Legislation / Certification		
Environmental impact		
ERP/SAP		
Industrial risk management		
Production	80 h	6
Lean manufacturing		
Materials forming		
Assembly techniques		
Additive layer manufacturing		
Production management		
Mechanical research / design	80 h	6
Dimensioning against fatigue		
Basic structural dynamics		
Experimental and numerical structural dynamics		
Experimental and numerical aerodynamics		
Recycling / End of life		
Systems research	80 h	6
Advanced systems control		
Embedded systems		
Fly by wire		
Human-machine interaction		



STRUCTURES & MATERIALS MAJOR

COMPULSORY CUs - 4th YEAR	HOURS	ECTS
Tools for engineers	80 h	5
Labour law		
Business game		
Risk management		
Statistics for engineering		
English		
Materials and processes	80 h	5
Introduction to research		
Metallic materials, alloys, polymers and composites		
Characterising materials		
Materials plasticity		
Shaping materials		
Mechanics and modelling	100 h	7
Advanced strength of materials		
Structural dynamics (part 1)		
Finite Element Method (theory & software)		
Introduction to modelling the muscular-skeletal system and analysing a sporting movement		
Application	100 h	6
Modelling dynamic actions (wind, swell, shocks and explosions)		
Aerodynamics of vehicles and large-scale civil engineering or building structures		
Dimensioning methods		
Design-modelling project (example in industry in the form of an engineering consulting firm)		
Conferences and visits		
Project	150 h	7
COMPULSORY CUs - 5th YEAR	HOURS	ECTS
From materials to structure	80 h	6
Metallurgy (with practical work)		
Polymers – plastics processing		
Composite materials		
Floors, concrete, etc.		
Advanced structural computation	80 h	6
Structural analysis through Finite Element Method		
Structural dynamics (part 2)		
Non-linear behaviour (plasticity, buckling, etc.)		
Assembly computation and types (soldering, bolting, riveting)		
Project	150 h	7
ELECTIVE CUs - 5th YEAR - 2 TO BE CHOSEN	HOURS	ECTS
Durability	80 h	6
Fatigue and reliability		
Fracture mechanics and damage		
Corrosion		
Pathology		
Materials	80 h	6
Microscopic behaviour of materials (transfer and dissemination)		
Microscopic and macroscopic behaviour of materials		
Intelligent composite materials		
Nanomaterials and innovative materials		
Sports biomechanics	80 h	6
Issues relating to high-performance sport		
Analysis and modelling of sporting movements		
Improvement of sporting performance and equipment		
Automotive industry	80 h	6
Press forming		
Vehicle dynamics – road-handling		
Vibrations – vehicle acoustics		
High-speed dynamics and crashworthiness		
Structures	80 h	6
Skyscrapers		
Paraseismic engineering		
Ships and offshore structures		
Road and rail infrastructure, bridges, works of art		



ENGINEERING & DIGITAL TECHNOLOGIES MAJOR

COMPULSORY CUs - 4th YEAR	HOURS	ECTS
Tools for engineers Labor law Introduction to economy Business game / English	64 h	5
Software engineering I (web development) JAVA language / CMMI best practices Project management / Systems engineering Web design / Security in design and development The current big issues of security	90 h	6
Tech trends Introduction to robotics / Blockchain Proprietary versus opensource : a strategic choice AI - Bot and Machine Learning / API architecture strategy / Internet of Things (IoT) / Virtual Reality Augmented Reality	45 h	3
Project	150 h	6
ELECTIVE CUs - 4th YEAR	HOURS	ECTS
COURSE UNIT - 1 TO BE CHOSEN		
Contracting authority IS architecture IS governance and Corporate functions ICT law IS security policy General contracting assistance in project mode Quality engineering	70 h	5
Cybersecurity Cybersecurity / Cryptography Intrusion testing / Digital Forensics Data protection The jobs in IT security	70 h	5
COURSE UNIT - 1 TO BE CHOSEN		
ICT & mobility Mobile development Mobile devices Web marketing	64 h	5
Infrastructure & Networks Systems and Networks CISCO Infrastructures	64 h	5
COMPULSORY CUs - 5th YEAR	HOURS	ECTS
Information system management Information needs in IS models / Communication Architecture design / ERP SAP / Ergonomics Conferences	60 h	5
Software engineering II JAVA language - developers frameworks / Agile process design / Software testing / Design pattern (BPMN) / Conferences	70 h	5
Project	150 h	6
ELECTIVE CUs - 5th YEAR	HOURS	ECTS
COURSE UNIT - 1 TO BE CHOSEN		
Virtual reality & Augmented reality Virtual reality / Augmented reality	50 h	4
IoT Embedded systems for health Internet of Things (IOT)	50 h	4
COURSE UNIT - 1 TO BE CHOSEN		
BI & data analysis Statistical data analysis / BIG DATA - analysis method / Business Intelligence / Data mining Neural networks / Artificial Intelligence	64 h	5
Cloud computing BIGDATA SAP HANA Platform / Distributed and cloud computing / The various services : SaaS, IaaS, PaaS / The various deployment models : private, community, public, hybrid / Open source / Datacenter visit	64 h	5
COURSE UNIT - 1 TO BE CHOSEN		
Consultancy & audit / Security audit Offshore for IS / ICT law / Change management Security audit / Conferences	80	5
Business transformation Digital transformation / Artificial Intelligence - Bot and machine learning / Smart systems / Embedded systems / Real-time / Robotics / E-health issues / Industry 4.0	80	5



ENGINEERING & MANAGEMENT MAJOR

COMPULSORY CUs - 4th YEAR	HOURS	ECTS
Basic and transversal tools Project and risk management Agile Foundation Statistics	64 h	5
Process optimisation Optimisation issues Modelisation, simulation Operational research Cost drivers	64 h	5
IS and business data issues IT governance - ITIL Data science level 1 Introduction to the IOT A.I for business	64 h	5
Career and skills Sectors and Practices Key market issues Thematic workshops Business innovation / Serious Game Multicultural management	64 h	5
Project	150 h	5
ELECTIVE CUs - 4th YEAR - 1 TO BE CHOSEN	HOURS	ECTS
Corporate Darwinism Business contracts Geopolitics / International economics Corporate finance Macro Economics & conjuncture	64 h	5
IS project management Decision process Tenders & bidding level 1 IT program organisation CRM & Digital marketing level 1	64 h	5
COMPULSORY CUs - 5th YEAR	HOURS	ECTS
COURSE UNIT - 1 TO BE CHOSEN		
Advanced IS project management (Track 1) Project lifetime & ALM Tenders and bidding level 2 Cloud computing Management of innovation	103 h	5
Supply chain 1 (Track 2) Supply chain: issues and outlook Production management General roadmap Sales forecast / demand planning	103 h	5
COURSE UNIT - 1 TO BE CHOSEN		
Business intelligence & engineering (track 1) Business intelligence Data science level 2 Decision management systems CRM & digital marketing level 2 Business analysis	103 h	5
Supply chain 2 (Track 2) Purchasing Distribution management Management of uncertainty Lean management Quality Management	103 h	5
Projet	150 h	5
ELECTIVE CUs - 5th YEAR - 1 TO BE CHOSEN	HOURS	ECTS
Financing and entrepreneurship Business strategy / Business model canvas Accounting for finance and management M&A external growth strategies Technology Financing	103 h	5
Factory 4.0 4.0 ISSUES Big data and 4.0 Industrialisation HR organisations	103 h	5



ENGINEERING & HEALTH MAJOR

COMPULSORY CUs - 4th YEAR	HOURS	ECTS
Tools for engineers Project management Business Game / Labour law Statistical analysis and medical applications Regulatory affairs and quality / English	80 h	6
The health sector (organisation, economy, regulations, nowadays issues) The health system The hospital sector Healthcare issues in the 21 st century Evaluation and accreditation method, legislation of medical devices Data protection and privacy, standards Conference: economic players Conference: biomedical engineering, high-growth sectors and positions	80 h	6
Medical knowledge Human body system Pathologies Medical semantics Drug/pharmaceutical treatment Physiological systems and signals, associated sensors Introduction to medical robotics Conference : the engineer-doctor relationship	80 h	6
Project	150 h	6
ELECTIVE CUs - 4th YEAR - 1 TRACK TO BE CHOSEN	HOURS	ECTS
BIOMECHANICS TRACK		
Health and mechanics Biomechanics and biocompatible materials Analysis of movement Anatomy of the human body and orthopaedic surgery Prosthesis and orthopaedic systems Functional rehabilitation	80 h	6
INFORMATION SYSTEMS TRACK		
Digital health ICT and care protocols Management of healthcare IS Urbanisation of healthcare IS Aid to decision-making (diagnostics, therapy, etc.) Telemedicine and healthcare networks	80 h	6
COMPULSORY CUs - 5th YEAR	HOURS	ECTS
Administrative, legal and medical aspects Medical imaging / Medical ethics Health law Medico-administrative aspects (invoicing medical procedures) Clinical aspects / Innovation management DMP/DPI/DCC Laboratory/hospital visits Overview of medical equipment	107 h	8
Project	150 h	6
ELECTIVE CUs - 5th YEAR - 1 TRACK TO BE CHOSEN	HOURS	ECTS
INFORMATION SYSTEMS TRACK		
Tech trends Wireless sensor networks Big data and healthcare (warehousing, data mining) Virtual reality and augmented reality Machine learning / IoT / Real time / Ergonomics	107 h	8
Healthcare workflows Laboratory management systems Picture archiving and communication systems Standards and inter-operability Security, traceability, confidentiality of health data Medical devices in vivo/embedded systems	107 h	8
BIOMECHANICS TRACK		
Medical robotics Dynamic modelling of anti-body systems Pattern learning and recognition Robotic systems modelling and control Perception systems / Haptics Clinician-robot interface, patient-robot interface Real time / Ergonomics	107 h	8
Biomedical Tribology in vivo Tissue biology / Medical devices Prosthetic and orthotic design Nano bio technologies and bio microsystems Bio design and bio engineering	107 h	8



ENERGY & ENVIRONMENT MAJOR

COMPULSORY CUs - 4th YEAR	HOURS	ECTS
Industrial engineering Process systems engineering Industrial engineering and energy processes Industrial context (health, safety, environment and quality, corporate social responsibility, market, issues, etc.)	64 h	5
Digital Local intelligence Big data Digital tools for energy and the environment	64 h	5
Communication and management "Energy & Environment" Forum Economic and financial management / crisis management English	64 h	5
Project	150 h	5
COMPULSORY CUs - 5th YEAR		
Land management Geopolitics, sustainable development and land Hydraulic, electric and thermic networks Sustainability literacy test	64 h	5
Circular economy Materials, eco-design, life cycle analysis Industrial ecology Resource economics and function economics	64 h	5
Corporate relations Professional communication Labour law and industrial security Tendering	64 h	5
Project	150 h	5
ELECTIVE CUs - 2 TO BE CHOSEN PER YEAR		
ENVIRONMENT		
Environment engineering Carbon and ecological footprints Rehabilitation of industrial sites Waste and societal analysis Multiphase Transfers and Climate Cycles	64 h	5
Hydraulic engineering Hydraulic and flood risks Water quality and treatment Water reuse	64 h	5
Ecological transition technologies Mineral resources and material recovery Waste to energy Raw materials stock modelling (supply risks/ criticality)	64 h	5
ENERGY		
Traditional energy Nuclear energy Fossil fuel energy Operation	64 h	5
Renewable energy Electricity production Heat and cold production	64 h	5
Energetics Energetics Energy efficiency Energy storage (thermal and electric)	64 h	5
DIGITAL		
Energy and environmental sensors Sensors and instrumentation Acquiring, processing and using data	64 h	5
Smart systems From Smart Building to Smart City From Smart Water to Smart City Smart Grid & Smart Industry	64 h	5



BUILDINGS & ECO CITIES MAJOR

COMPULSORY CUs - 4th YEAR	HOURS	ECTS
Numerical tools	80 h	6
Applied system engineering Statistical Data Processing Engineering CAD tools-Autocad / Sketchup PRO BIM (Intro + Revit) GIS (Intro + Qgis + ArcGis)		
Urban planning, Eco-cities and urban systems	80 h	6
Urban design and spatial planning Urban Network Engineering Management of complex urban projects Future cities (Smart Grid)		
Physics and Structure of Building	80 h	6
Physical acoustics Advanced heat transfer Structural mechanics Dimensioning of structural elements Behaviour of materials (building materials)		
Projects Management / Cost and impact assessment / Language	80 h	6
Project management Architectural and urban planning Labor law Quality management Risk management English		
Project	150 h	6
COMPULSORY CUs - 5th YEAR	HOURS	ECTS
Dimensioning of structures	100 h	7
Soil and Foundations Actions on structures Introduction to the Finite Element Method Steel structures according to Eurocode 3 Reinforced concrete according to Eurocode 2 Materials		
Energy & Buildings	100 h	7
Thermal engineering of buildings Applied acoustics Lighting Renewable Energies Dynamic thermal simulation (DTS) HVAC systems		
Project	150 h	6
ELECTIVE CUs - 5th YEAR - 2 TO BE CHOSEN	HOURS	ECTS
Construction and modelling of structures	60 h	5
Soil mechanics Structural dynamics Seismic calculation Modelling of structures by finite elements (Robot Structural Analysis) Construction Methods		
BIM	60 h	5
BIM theory - Norms, standards and interoperability (IFC, XML, UNIFORMAT ...) Advanced Revit BIM project (BIM chart, organizational aspect, change management...) BIM in practice (BIM Conception, BIM Realisation, BIM Exploitation...)		
Sustainable Architecture	60 h	5
From ancient architecture to Smart House Bioclimatic Architecture Architectural analysis & Building renovation Environmental assessment (LCA)		



MSC INNOVATION, CREATION & ENTREPRENEURSHIP MAJOR

1st SEMESTER	HOURS	ECTS
Entrepreneurial Spirit Training The spirit of entrepreneurship The fine art of failure Development Sessions (PPP) Introduction to fencing	24 h	2
Project Management Training Entrepreneurial team formation Design thinking Intellectual property for innovators and entrepreneurs	36 h	3
Business Development Training Rethinking and designing new business model Entrepreneurial finance Business plan achievement Customer acquisition for new venture	57 h	6
Business Development Challenge Local entrepreneurs provide a comprehensive picture of the objectives assigned to their companies. Students will have to elaborate a business development plan to reach them. Three days format-small teams of 4 or 5 students	18 h	3
Emergence of product & project management Product lifecycle management 1: Requirements Product Definition Industrial project management	30 h	4
Entrepreneurial Culture & Networking Conferences (entrepreneurs, experts, business angels,...) - Workshops (incubators) - Hackathon	36 h	
Technological engineering & dynamics Product lifecycle management 2: Digital MockUp & Additive Manufacturing Numerical simulation Ecodesign	46 h	6
Entrepreneurial & Innovative Project PROBLEMATIZATION Approval Stage One BUSINESS MODEL Approval Stage Two Professional tutoring	34 h	6
2nd SEMESTER		
Turnaround Management Training Crisis strategy Turnaround Management	30 h	4
Turnaround Case Study Challenge Students have to work on a case study dedicated to turnaround management. During the competition, professionals will advise them to reach coherence and consistency. Four days format-small teams of 4 and 5 students	24 h	3
Business Game Business Game	30 h	5
Make or Break Challenge Students will randomly pick an entrepreneurial subject and will have to address the issue in a limited time and in a public area. Three days format Individual challenge	18 h	5
Industrial & commercial responsiveness Supply chain Lean manufacturing	18 h	3
Entrepreneurial Culture & Networking Conferences (entrepreneurs, experts, business angels,...) - Workshops (incubators) - Hackathon	18 h	
System integration Product lifecycle management 3: Connected Objects	18 h	2
Product Development Students will apply engineering courses to develop a product during the academic year Two days format-small teams of 5 or 6 students	12 h	2
Entrepreneurial & Innovative Project BUSINESS PLAN Approval Approval Stage Three IMPLEMENTATION Approval Stage Four Professional tutoring	34 h	3

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