Ingénieur ENSEEIHT Electronique et Génie Electrique

Ingénieur ENSEEIHT Electronique et Génie Electrique

ECTS
180 credits

Duration
3 ans

Teaching organization
Formation professionnelle, Formation initiale

Program

Ingénieur ENSEEIHT Electronique et Génie électrique (En-Ge) 1ère année

Semestre 5 3EA-FISE

	Nature	CM	TD	TP	Crédits
Integration and probabilities	UE				5 credits
Integration	UE				
Complex Variable	UE				
Probabilities	UE				
Introduction to Algorithmic, Programming and Computer Architecture	UE				5 credits
Algorithms and Imperative Programming	UE				
Architecture and Assembler-programming	UE				
Digital Systems Design	UE				5 credits
Theoretical Approach of combinational and sequential logic	UE				
Digital Functions and Technologies	UE				
Project : Design of sequential and combinatoria Digital units	UE				
Fundamental Circuit Theory	UE				5 credits
Electric Circuits Analysis Methods	UE				
Instrumentation and Power Circuits	UE				
Circuits labs	UE				
Physics for Electrical Engineering	UE				5 credits
Electromagnetism	UE				
Material Physics	UE				
Propagation in Transmission Lines	UE				
Soft and Human Skills	UE				5 credits
Professional Communication and English-S5-LV1	Matière				
Second language	Choix				
Espagnol-S5	Matière				
Portugais-S5	Matière				
Chinois-S5	Matière				
Italien-S5	Matière				
Japonais-S5	Matière				
Russe-S5	Matière				
Allemand-S5	Matière				
FLE - S5	Matière				
LSF - S5	Matière				
Sports	Matière				
Careers and Management - Sem.5	Matière				

Semestre 6-3EA-FISE

	Nature	CM	TD	TP	Crédits
Numerical Analysis and Statistics	**UE**				5 credits
Differential Calculation and Optimisation	UE				
Solving PDEs using finite differences	LV2 facultative				
Statistics	UE				
Signal and Control	**UE**				5 credits
Signal Processing	UE				
Digital Signal Processing	UE				
Continuous Linear Systems Control	UE				
Electric circuits and systems	**UE**				5 credits
Modeling by physical analogies & analysis	UE				
Op-amps and Compensation	UE				
Course (1 choice out of 2)	UE				
Advanced Amplifier Systems	UE				
Modeling of magnetic circuits	EC				
Components and Architecture	**UE**				5 credits
Semiconductors Physics and PN Junctions	UE				
Signal and Power Transistors	UE				
Course (1 choice out of 2)	UE				
Transistors Amplifier Circuits	UE				
Introduction to Static Conversion	UE				
Teaching unit (1 choice out of 3)	**UE**				5 credits
CONNECTED OBJECTS	UE				5 credits
Connected Objects	UE				
ELECTRICAL PLANE	UE				5 credits
Airplane Electrical Networks	UE				
Basic Structures for C/A and A/C Conversion	UE				
Electromecanic conversion	UE				
INTRODUCTION TO TELECOMMUNICATIONS	UE				5 credits
Introduction to Digital Communications	Matière				
Introduction to networks	Matière				
SOFT AND HUMAN SKILLS 2	**UE**				5 credits
Elément à choix UE SHS S6 FISE	Élément constitutif				
Professional Communication and English-LV1-Sem.6	Matière				
Sports	Matière				
Leadership Part 1 - S6	Matière				
Leadership Part 2 - S6	Matière				
Entrepreneuship Part 1 - S6	Matière				
Entrepreneurship Part 2 - S6	Matière				
Citizenship Part 1 - S6	Matière				

Citizenship Part 2 - S6	Matière
Agile methods	Matière
Managership P1-S6	Matière
Managership P2-S6	Matière
Spanish	Matière
Portuguese	Matière
Chinese	Matière
Italian	Matière
Japonese	Matière
Russian	Matière
German	Matière
French as a Foreign Language	Matière
FSL - S6	Matière

Ingénieur ENSEEIHT Electronique et Génie électrique (En-Ge) 2ème année

Semestre 7 - Parcours à choix (manuel)

	Nature	CM	TD	TP	Crédits
Semestre 7 - Electronics (EN)	Choix				30 credits
RADIOFREQUENCY ANALOG ELECTRONICS	UE				5 credits
RF Active Circuits	UE				
PLL and Oscillators	UE				
Analog Filtering	UE				
TP Advanced Design System (ADS)	UE				
LOW FREQUENCY ANALOG ELECTRONICS	UE				5 credits
Amplification classes	UE				
Analog Project	UE				
DIGITAL ELECTRONICS	UE				5 credits
VHDL	UE				
Front-End instrumentation	UE				
ELECTROMAGNETIC PROPAGATION	UE				5 credits
Guided propagation	UE				
Ideal Passive Circuits	UE				
Transmission Lines	UE				
INFORMATION PROCESSING	UE				5 credits
Random Signals	UE				
Object-Oriented Programming (POO)	UE				
Microprocessor	UE				
SOFT AND HUMAN SKILLS	UE				5 credits
Professional Communication and English -Lv1-Sem.7	Matière				
2nd language	Bloc				
Espagnol-S7	Matière				
Portugais-S7	Matière				
Chinois-S7	Matière				

Italien-S7	Matière	
Japonais-S7	Matière	
Russe-S7	Matière	
Allemand-S7	Matière	
FLE - S7	Matière	
LSF - S7	Matière	
Sports	Matière	
Leadership & Management	Matière	
Semestre 7 - Electronics, Electrical Energy and Simulations (EEES)	**Choix**	**30 credits**
ELECTROMAGNETIC PROPAGATION	UE	5 credits
Guided propagation	UE	
Ideal Passive Circuits	UE	
Transmission Lines	UE	
COMPUTER SCIENCE AND ANALOG FILTERING	UE	5 credits
Analog Filtering	UE	
Object-Oriented Programming (POO)	UE	
Reliability of numerical calculations	Matière	
SCIENTIFIC COMPUTING FOR ELECTRICAL ENGINEERING	UE	5 credits
Random Signals	UE	
Numerical analysis	Matière	
Numerical Methods for PDE	Matière	
POWER ELECTRONIC COMPONENTS AND MECATRONIC	UE	5 credits
Electro-megneto-thermal modeling and simulation of power electronic components	Matière	
Principle and structure of machines	Module	
ELECTRICAL MACHINE MODELING AND NUMERICAL SIMULATION	UE	5 credits
Electromagnetic modeling of machines	UE	
Numerical experiences	Matière	
SOFT AND HUMAN SKILLS	UE	5 credits
Professional Communication and English -Lv1-Sem.7	Matière	
2nd language	Bloc	
Espagnol-S7	Matière	
Portugais-S7	Matière	
Chinois-S7	Matière	
Italien-S7	Matière	
Japonais-S7	Matière	
Russe-S7	Matière	
Allemand-S7	Matière	
FLE - S7	Matière	
LSF - S7	Matière	
Sports	Matière	
Leadership & Management	Matière	
Semestre 7 - Energy (NRJ)	**Choix**	**30 credits**
COMPUTER SYSTEMS ARCHITECTURE AND DEVELOPMENT	UE	5 credits
Object-oriented design and programming	UE	

Principles of Operating Systems	UE	
Computer Architecture	UE	
STATIC CONVERTER SYNTHESIS AND DESIGN	UE	5 credits
Energy approaches to the design of static converters	UE	
Static Converter Design Project	UE	
ELECTRICAL MACHINES	UE	5 credits
Electromagnetic modeling of machines	UE	
Principle and structure of machines	Module	
ELECTRICAL NETWORKS	UE	5 credits
Energy of today and tomorrow	UE	
Electrical energy technology	UE	
Electrical energy transmission network	UE	
Modulation and filtering of voltage inverters	UE	
LINEAR SYSTEMS CONTROL	UE	5 credits
Identification	UE	
Sampled systems	UE	
Synthesis of correctors and control architectures	UE	
Automatic Tutorials	UE	
SOFT AND HUMAN SKILLS	UE	5 credits
Professional Communication and English -Lv1-Sem.7	Matière	
2nd language	Bloc	
Espagnol-S7	Matière	
Portugais-S7	Matière	
Chinois-S7	Matière	
Italien-S7	Matière	
Japonais-S7	Matière	
Russe-S7	Matière	
Allemand-S7	Matière	
FLE - S7	Matière	
LSF - S7	Matière	
Sports	Matière	
Leadership & Management	Matière	

Semestre 8 - Parcours à choix (manuel)

	Nature	CM	TD	TP	Crédits
Semestre 8 - Systems Integration (INSYS)	Choix				30 credits
FROM SILICON TO INTEGRATED CIRCUIT	UE				5 credits
From Silicon to Integrated Circuits	UE				
MICROWAVES	UE				5 credits
HFSS	UE				
Antennas Project	UE				
Microwave Project	UE				
Microwave Tutorials	Matière				
DIGITAL SYSTEMS ARCHITECTURE	UE				5 credits
Synchronous design of digital systems	Matière				

FPGA technology	UE	
Verification	EC	
CIRCUITS AND OPTOELECTRONICS	UE	5 credits
Analog integrated circuits	UE	
Optoelectronics	UE	
Optoelectronics Tutorials	Matière	
NANOSATELLITE SYSTEMS	UE	5 credits
Cubesat platform: an introduction	Matière	
Payload Sizing	Matière	
SOFT AND HUMAN SKILLS	UE	5 credits
Professional Communication and English-Sem.8	Matière	
Second language	Choix	
Espagnol-S8	Matière	
Portugais-S8	Matière	
Chinois-S8	Matière	
Italien-S8	Matière	
Japonais-S8	Matière	
Russe-S8	Matière	
Allemand-S8	Matière	
FLE - S8	Matière	
LSF - S8	Matière	
Sports	Matière	
Careers and Management - Sem.8	Choix	
Leadership	Matière	
Entrepreneurship	Matière	
Citizenship	Matière	
Managership-S8	Matière	
Semestre 8 -Communication Systems (SYSCOM)	**Choix**	**30 credits**
APPLIED MATHEMATICS	UE	5 credits
Advanced linear algebra	UE	
Hilbertian analysis	UE	
Optimisation under constraints	Matière	
PHYSICAL PHENOMENA AND MODELING	UE	5 credits
Electromagnetic radiation and antennas	Matière	
Physical analysis of guiding structures	UE	
Project: Modelling of structures in EM	Matière	
MICROWAVE DEVICES	UE	5 credits
Planar antennas and radiating apertures	UE	
Microwave Project	UE	
Microwave Tutorials	Matière	
SCIENTIFIC COMPUTING AND OPTOELECTRONICS	UE	5 credits
Finite elements for electromagnetism	Matière	
Programming for scientific computing	Matière	
Optoelectronics	UE	
Optoelectronics Tutorials	Matière	
NANOSATELLITE SYSTEMS	UE	5 credits

Cubesat platform: an introduction	Matière	
Payload Sizing	Matière	
SOFT AND HUMAN SKILLS	UE	5 credits
Professional Communication and English-Sem.8	Matière	
Second language	Choix	
Espagnol-S8	Matière	
Portugais-S8	Matière	
Chinois-S8	Matière	
Italien-S8	Matière	
Japonais-S8	Matière	
Russe-S8	Matière	
Allemand-S8	Matière	
FLE - S8	Matière	
LSF - S8	Matière	
Sports	Matière	
Careers and Management - Sem.8	Choix	
Leadership	Matière	
Entrepreneurship	Matière	
Citizenship	Matière	
Managership-S8	Matière	
Semestre 8 - Numerical Physics (PN)	**Choix**	**30 credits**
APPLIED MATHEMATICS	UE	5 credits
Advanced linear algebra	UE	
Hilbertian analysis	UE	
Optimisation under constraints	Matière	
PHYSICAL PHENOMENA AND MODELING	UE	5 credits
Electromagnetic radiation and antennas	Matière	
Physical analysis of guiding structures	UE	
Project: Modelling of structures in EM	Matière	
NUMERICAL PROJECTS	UE	5 credits
Numerical Project	Matière	
MECATRONICS	UE	5 credits
Materials	UE	
Smart Electroactive Materials	UE	
Modeling of electromagnetic systems using analytical calculations	UE	
Thermal and Fluid Mechanics	UE	
SCIENTIFIC COMPUTING	UE	5 credits
Numerical simulation in optics	UE	
Numerical analysis 2	Matière	
Programming for scientific computing	Matière	
Optimal design of a rocket nozzle actuator	UE	
Finite elements for electromagnetism	Matière	
SOFT AND HUMAN SKILLS	UE	5 credits
Professional Communication and English-Sem.8	Matière	
Second language	Choix	
Espagnol-S8	Matière	

Portugais-S8	Matière	
Chinois-S8	Matière	
Italien-S8	Matière	
Japonais-S8	Matière	
Russe-S8	Matière	
Allemand-S8	Matière	
FLE - S8	Matière	
LSF - S8	Matière	
Sports	Matière	
Careers and Management - Sem.8	Choix	
Leadership	Matière	
Entrepreneurship	Matière	
Citizenship	Matière	
Managership-S8	Matière	
Semestre 8 - Real-time automated systems (SATR)	**Choix**	**30 credits**
CONTROLLED, NON LINEAR SYSTEMS	UE	5 credits
State space	UE	
Introduction to Non-linear control	UE	
Non-linear control	UE	
Automatic Tutorials	UE	
DIGITAL CONTROL	UE	5 credits
Digital control	UE	
Digital Control Project	UE	
Industrial automation	UE	
Automatic Control Systems Tutorials	UE	
ELECTRICAL SYSTEM ARCHITECTURES AND CONTROLS	UE	5 credits
Electric vehicle motor sizing / CVS-Machines design elements	LV2 facultative	
Converter control	UE	
Machine control	UE	
ZOE powertrain project	UE	
DISCRETE AND SAMPLED EVENT SYSTEMS	UE	5 credits
Polynomial control	UE	
Graphs and Scheduling	UE	
Identification (recursive methods)	UE	
Automatic Tutorials	UE	
Petri network	UE	
NETWORK AND REAL-TIME SYSTEMS ENGINEERING	UE	5 credits
Distributed Computer Systems	UE	
Industrial networks	UE	
Real-time systems	UE	
SOFT AND HUMAN SKILLS	UE	5 credits
Professional Communication and English-Sem.8	Matière	
Second language	Choix	
Espagnol-S8	Matière	
Portugais-S8	Matière	

Chinois-S8	Matière	
Italien-S8	Matière	
Japonais-S8	Matière	
Russe-S8	Matière	
Allemand-S8	Matière	
FLE - S8	Matière	
LSF - S8	Matière	
Sports	Matière	
Careers and Management - Sem.8	Choix	
Leadership	Matière	
Entrepreneurship	Matière	
Citizenship	Matière	
Managership-S8	Matière	
Semestre 8 - Parcours Systèmes Mécatroniques (SM)	**Choix**	**30 credits**
CONTROLLED, NON LINEAR SYSTEMS	UE	5 credits
State space	UE	
Introduction to Non-linear control	UE	
Non-linear control	UE	
Automatic Tutorials	UE	
DIGITAL CONTROL	UE	5 credits
Digital control	UE	
Digital Control Project	UE	
Industrial automation	UE	
Automatic Control Systems Tutorials	UE	
ELECTRICAL SYSTEM ARCHITECTURES AND CONTROLS	UE	5 credits
Electric vehicle motor sizing / CVS-Machines design elements	LV2 facultative	
Converter control	UE	
Machine control	UE	
ZOE powertrain project	UE	
ACTUATION MATERIALS	UE	5 credits
Materials	UE	
Smart Electroactive Materials	UE	
Finite element methods	UE	
Lagrangian approach to electromechanical systems	Matière	
ANALYTICAL AND PHYSICAL TOOLS FOR MECHATRONICS	UE	5 credits
System optimization and optimal design	UE	
Optimal design of a rocket nozzle actuator	UE	
Modeling of electromagnetic systems using analytical calculations	UE	
Thermal and Fluid Mechanics	UE	
SOFT AND HUMAN SKILLS	UE	5 credits
Professional Communication and English-Sem.8	Matière	
Second language	Choix	
Espagnol-S8	Matière	
Portugais-S8	Matière	
Chinois-S8	Matière	

Italien-S8	Matière	
Japonais-S8	Matière	
Russe-S8	Matière	
Allemand-S8	Matière	
FLE - S8	Matière	
LSF - S8	Matière	
Sports	Matière	
Careers and Management - Sem.8	Choix	
Leadership	Matière	
Entrepreneurship	Matière	
Citizenship	Matière	
Managership-S8	Matière	
Semestre 8 - Electrical systems of the future (SEF)	**Choix**	**30 credits**
CONTROLLED, NON LINEAR SYSTEMS	UE	5 credits
State space	UE	
Introduction to Non-linear control	UE	
Non-linear control	UE	
Automatic Tutorials	UE	
DIGITAL CONTROL	UE	5 credits
Digital control	UE	
Digital Control Project	UE	
Industrial automation	UE	
Automatic Control Systems Tutorials	UE	
ELECTRICAL SYSTEM ARCHITECTURES AND CONTROLS	UE	5 credits
Electric vehicle motor sizing / CVS-Machines design elements	LV2 facultative	
Converter control	UE	
Machine control	UE	
ZOE powertrain project	UE	
IMPLEMENTATION OF SWITCHING CELLS	UE	5 credits
Switching Mechanisms in Static Converters	UE	
Thermal	UE	
Static Converter close control project	UE	
RENEWABLE ENERGIES AND FACTS	UE	5 credits
Introduction to FACTS	UE	
Renewable energy: wind and solar power	UE	
SOFT AND HUMAN SKILLS	UE	5 credits
Professional Communication and English-Sem.8	Matière	
Second language	Choix	
Espagnol-S8	Matière	
Portugais-S8	Matière	
Chinois-S8	Matière	
Italien-S8	Matière	
Japonais-S8	Matière	
Russe-S8	Matière	
Allemand-S8	Matière	

FLE - S8	Matière	
LSF - S8	Matière	
Sports	Matière	
Careers and Management - Sem.8	Choix	
Leadership	Matière	
Entrepreneurship	Matière	
Citizenship	Matière	
Managership-S8	Matière	
Semestre 8 - Artificial intelligence for information processing (IATI)	**Choix**	**30 credits**
APPLIED MATHEMATICS	UE	5 credits
Advanced linear algebra	UE	
Hilbertian analysis	UE	
Optimisation under constraints	Matière	
DIGITAL SYSTEM ARCHITECTURE	UE	5 credits
FPGA technology	UE	
DSP	UE	
Synchronous design of digital systems	Matière	
IMAGE AND SIGNAL PROCESSING MODELING	UE	5 credits
Image processing	UE	
Image Project	Matière	
Modeling	UE	
Elective Course: Advanced Study in IATI	Bloc	10 credits
Advanced Study SIA	Choix	
SIGNAL ADVANCED METHODS	UE	5 credits
Signal representation and analysis	Matière	
Optimal filtering	Matière	
Multivariate analysis	Matière	
Inverse problems	Matière	
AI FUNDAMENTALS	UE	5 credits
Information Theory	Matière	
Introduction to Deep Learning	Matière	
Statistics - advanced methods	Matière	
Computational statistics	Matière	
Advanced Study TSE	Choix	
SIGNAL ADVANCED METHODS	UE	5 credits
Signal representation and analysis	Matière	
Optimal filtering	Matière	
Multivariate analysis	Matière	
AI INTRODUCTION	UE	5 credits
Introduction to Deep Learning	Matière	
General AI integration: first hardware integration	Matière	
SOFT AND HUMAN SKILLS	UE	5 credits
Professional Communication and English-Sem.8	Matière	
Second language	Choix	
Espagnol-S8	Matière	
Portugais-S8	Matière	

Chinois-S8	Matière
Italien-S8	Matière
Japonais-S8	Matière
Russe-S8	Matière
Allemand-S8	Matière
FLE - S8	Matière
LSF - S8	Matière
Sports	Matière
Careers and Management - Sem.8	Choix
Leadership	Matière
Entrepreneurship	Matière
Citizenship	Matière
Managership-S8	Matière

Semestre 7 3EA FISE Parcours - EEES

Semestre 7 3EA FISE Parcours Energie

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Semestre 9 - Parcours à choix (manuel)

	Nature	CM	TD	TP	Crédits
Semestre 9 - Systems Integration (INSYS)	Choix				30 credits
ANALOG ELECTRONIC SYSTEMS IN RADIOFREQUENCIES	UE				5 credits
Optoelectronic Components and Circuits	Matière				
Filter Synthesis	Matière				
Integrated photonics	Matière				
Internet of Things	Matière				
DIGITAL SYSTEMS	UE				5 credits
Synthesis strategy	Matière				
EMC for integrated circuits	Matière				
System on Chip	Matière				
ANALOG AND DIGITAL SYSTEMS	UE				5 credits
ADC and DAC	Matière				
Space Embedded Systems Conferences	Matière				
Integration of instrumentation chains	Matière				
Reliability of embedded systems	Matière				
1st ELECTIVE TEACHING UNIT	UE				5 credits
ADVANCED DIGITAL ELECTRONICS	UE				5 credits
FPGA system design for signal processing	Matière				
Circuit testing and fault simulation	Matière				
ADVANCED ANALOG ELECTRONICS	UE				5 credits
Integration of instrumentation chains	Matière				
Analog ASIC project	Matière				

2nd ELECTIVE TEACHING UNIT	UE	5 credits
POWER MANAGEMENT	UE	5 credits
Microprocessor Power Supply	Matière	
MOSFET Driver Circuits	Matière	
EMC for SMPS	Matière	
FEM Modeling of Integrated passive filters	Matière	
ADVANCED RADIOFREQUENCY ELECTRONICS	UE	5 credits
RF equipment	Matière	
MMIC	Matière	
MEMS	Matière	
SOFT AND HUMAN SKILLS 3EA S9	UE	5 credits
Professional English-LV1-Semestre 9	Bloc	
Anglais Scientifique	Matière	
Choix 2 Anglais Professionnel - 3A	Choix	
Anglais Clinique	Matière	
Anglais de Cambridge ou Projet	Matière	
CV Entretiens(3EA)	Matière	
Recherche doc.(3EA)	Matière	
CHOIX Careers and Management 3EA S9	Choix	
Entrepreneurship Project	Matière	
Corporate Project and Social Responsability	Matière	
Semestre 9 - Communication Systems (SYSCOM)	**Choix**	**30 credits**
APPLIED PHYSICS AND NUMERICAL METHODS	UE	5 credits
Electromagnetism and multiscale devices	Matière	
Multiphysics Models	Matière	
Electromagnetism and nanoelectronics	Matière	
Synthesis of High Frequency Equivalent Electrical Circuits	Matière	
HIGH FREQUENCY EMBEDDED SYSTEMS	UE	5 credits
Microwave and Optical Sensors	Matière	
HF optoelectronic components and circuits	Matière	
Internet of Things	Matière	
Passive high frequency devices in waveguide technology	Matière	
MICROWAVE CIRCUITS AND ELECTROMAGNETIC COMPATIBILITY	UE	5 credits
Antenna networks	Matière	
Space antennas	Matière	
Aeronautical EMC 1	Matière	
Space Embedded Systems Conferences	Matière	
Microwave power amplifiers	Matière	
Aeronautical EMC 2	Matière	
PROPAGATION PHENOMENA AND RADAR	UE	5 credits
Actual propagation of electromagnetic waves	Matière	
Electromagnetic diffraction analysis / Radar equipment	Matière	
Radar project	Matière	
ELECTIVE TEACHING UNIT	Choix	5 credits
ADVANCED RADIOFREQUENCY ELECTRONICS	UE	5 credits
RF equipment	Matière	

MMIC	Matière	
MEMS	Matière	
MODELING	UE	5 credits
Variational methods for solving partial differential equations of physics	Matière	
Integral methods	Matière	
Plasma physics and applications	Matière	
SOFT AND HUMAN SKILLS 3EA S9	UE	5 credits
Professional English-LV1-Semestre 9	Bloc	
Anglais Scientifique	Matière	
Choix 2 Anglais Professionnel - 3A	Choix	
Anglais Clinique	Matière	
Anglais de Cambridge ou Projet	Matière	
CV Entretiens(3EA)	Matière	
Recherche doc.(3EA)	Matière	
CHOIX Careers and Management 3EA S9	Choix	
Entrepreneurship Project	Matière	
Corporate Project and Social Responsability	Matière	
Semestre 9 - Computational Physics (PN)	**Choix**	**30 credits**
ENVIRONMENT FOR INTENSIVE COMPUTING	UE	5 credits
BES langages avancés (C++, Phyton)	Matière	
Environnement Logiciel du Calcul Scientifique	Matière	
Techniques de génération maillage, pré/post processing	Matière	
NUMERICAL METHODS FOR DIFFRACTION PROBLEMS	UE	5 credits
Integral methods	Matière	
Electromagnetic diffraction analysis / Radar equipment	Matière	
PHYSICS FOR MECHATRONICS	UE	5 credits
Plasma physics and applications	Matière	
Advanced phenomena in electromechanical conversion	Matière	
Modeling of coupled phenomena	Matière	
Introduction to Magnetohydrodynamics	Matière	
EMC AND APPLIED MATHEMATICS	UE	5 credits
Aeronautic EMC 1	Matière	
Electromagnetic compatibility	Matière	
High Performance Computing	Matière	
Variational methods for solving partial differential equations of physics	Matière	
Multiphysics Models	Matière	
NUMERICAL METHODS AND OPTIMISATION	UE	5 credits
Topological Optimisation	Matière	
Finite element numerical modelling	Matière	
Optimal control	Matière	
Finished volumes	Matière	
SOFT AND HUMAN SKILLS 3EA S9	UE	5 credits
Professional Communication and English-Semestre 9	Bloc	
Scientific English	Matière	
Choix 2 Anglais Professionnel - 3A	Choix	
Anglais Clinique	Matière	

Anglais de Cambridge ou Projet	Matière	
CV Entretiens(3EA)	Matière	
Recherche doc.(3EA)	Matière	
CHOIX Careers and Management 3EA S9	Choix	
Entrepreneurship Project	Matière	
Corporate Project and Social Responsability	Matière	
Semestre 9 - Control Architecture Computer Science and Embedded Systems (ACISE)	**Choix**	**30 credits**
SYSTEMS CONTROL, FILTERING AND DIAGNOSTIC	UE	5 credits
Filtering estimation	Matière	
System Monitoring and Diagnostics	Matière	
Multidimensional Systems	Matière	
OPTIMISATION DES SYSTEMES ET LEUR COMMANDE	UE	5 credits
Robust control	Matière	
Optimal Control	Matière	
Combinatorial optimization	Matière	
Opti TER	Matière	
Linear programming and unimodularity	Matière	
Continuous optimization	Matière	
MODELING, ANALYSIS, SIMULATION OF DISCRETE SYSTEMS	UE	5 credits
Modeling and analysis of discrete systems	Matière	
Simulation of discrete event systems	Matière	
Planning and Scheduling	Matière	
Hybrid Dynamic Systems	Matière	
Flexible Workshop TER	Matière	
ADVANCED CONTROLLED SYSTEMS	UE	5 credits
Adaptive and predictive controls	Matière	
Aeronautical systems	Matière	
Robotics: Modeling and Control	Matière	
Advanced Control TER	Matière	
Electrical Systems Control	Matière	
ADVANCED CRITICAL COMPUTING SYSTEMS	UE	5 credits
IT Security	Matière	
IT operational security	Matière	
Safety Testing and Evaluation	Matière	
Development of critical computer systems	Module	
SOFT AND HUMAN SKILLS 3EA S9	UE	5 credits
Professional English-LV1-Semestre 9	Bloc	
Anglais Scientifique	Matière	
Choix 2 Anglais Professionnel - 3A	Choix	
Anglais Clinique	Matière	
Anglais de Cambridge ou Projet	Matière	
CV Entretiens(3EA)	Matière	
Recherche doc.(3EA)	Matière	
CHOIX Careers and Management 3EA S9	Choix	
Entrepreneurship Project	Matière	

Corporate Project and Social Responsability	Matière	
Semestre 9 - Advanced Electromechanics (EMA)	**Choix**	**30 credits**
PHYSICS FOR MECHATRONICS	UE	5 credits
Advanced phenomena in electromechanical conversion	Matière	
Introduction to Magnetohydrodynamics	Matière	
Modeling of coupled phenomena	Matière	
NUMERICAL METHODS AND OPTIMISATION	UE	5 credits
Finite element numerical modelling	Matière	
Optimal control	Matière	
Optimised sizing of electrical machines	Matière	
Numerical modelling of machines	Matière	
DESIGN OF ELECTROMECHANICAL SYSTEMS	UE	5 credits
Design elements of static converters	Matière	
Mechanical design of actuators and generators	Matière	
Introduction to CAD	Matière	
Electric Generators	Matière	
ARCHITECTURES OF MECHATRONIC SYSTEMS	UE	5 credits
Multidimensional Systems	Matière	
Electric actuator control strategy	Matière	
TER Electric Actuator Control	Matière	
Electromagnetic compatibility	Matière	
Filtering estimation	Matière	
APPLIED MECHATRONICS	UE	5 credits
TER Advanced Control (EMA)	Matière	
Elastic metamaterials and actuators for space (Universeh)	Matière	
Winding techniques for electrical machines	Matière	
System Monitoring and Diagnostics	Matière	
SOFT AND HUMAN SKILLS 3EA S9	UE	5 credits
Professional English-LV1-Semestre 9	Bloc	
Anglais Scientifique	Matière	
Choix 2 Anglais Professionnel - 3A	Choix	
Anglais Clinique	Matière	
Anglais de Cambridge ou Projet	Matière	
CV Entretiens(3EA)	Matière	
Recherche doc.(3EA)	Matière	
CHOIX Careers and Management 3EA S9	Choix	
Entrepreneurship Project	Matière	
Corporate Project and Social Responsability	Matière	
Semestre 9 - Energy conversion and electrical networks (CERE)	**Choix**	**30 credits**
POWER SYSTEMS AND NETWORKS	UE	5 credits
System design	Matière	
Static Converters for power network conditioning	Matière	
Static Converters HVDC Networks	Matière	
CVS DESIGN	UE	5 credits
CVS Design	Matière	

CVS control	Matière	
Architecture and Control TER	Matière	
Power Electronic Technology	Matière	
STATIC CONVERTER AND ADVANCED SYSTEMS	UE	5 credits
CVS reliability	Matière	
EMC	Matière	
X. Levels	Matière	
Switching and functional integration	Matière	
ACTUATORS AND GENERATORS	UE	5 credits
Actuator control	Matière	
Actuator Control TER	Matière	
Multidimensional Systems	Matière	
Conception avancée des actionneurs et générateurs	UE	
SMARTGRIDS AND MICROGRIDS	UE	5 credits
Autonomous networks	Matière	
Sources, reversibility, storage	Matière	
Smart grids	Matière	
1/2 Themed days	Matière	
SOFT AND HUMAN SKILLS 3EA S9	UE	5 credits
Professional English-LV1-Semestre 9	Bloc	
Anglais Scientifique	Matière	
Choix 2 Anglais Professionnel - 3A	Choix	
Anglais Clinique	Matière	
Anglais de Cambridge ou Projet	Matière	
CV Entretiens(3EA)	Matière	
Recherche doc.(3EA)	Matière	
CHOIX Careers and Management 3EA S9	Choix	
Entrepreneurship Project	Matière	
Corporate Project and Social Responsability	Matière	
Semestre 9 - Artificial Intelligence and Information Processing (IATI)	**Choix**	**30 credits**
SIGNAL AND APPLICATIONS	UE	5 credits
Antenna processing	Matière	
Automatic speech processing	Matière	
Audio et musique	Matière	
Satellite navigation	Matière	
AI AND HARDWARE	UE	5 credits
Edge computing	Matière	
Design of NN dedicated to embedded systems	Matière	
ELECTIVE TEACHING UNIT	Bloc	15 credits
ELECTIVE TEACHING UNIT SIA	Choix	
IMAGE - APPLICATIONS	UE	5 credits
Computational imaging	Matière	
Computational medical imaging	Matière	
Teledetection	Matière	
LEARNING AND DECISION	UE	5 credits
Data analysis	Matière	

Unsupervised learning	Matière	
Supervised learning	Matière	
VISION, AUGMENTED REALITY AND APPLICATIONS	UE	5 credits
Computer vision and augmented reality	Matière	
Transversal project	Matière	
ELECTIVE TEACHING UNIT TSE	Choix	
EMBEDDED SYSTEMS	UE	5 credits
System on Chip	Matière	
Architecture and hardware acceleration for DL	Matière	
AI AND SENSORS	UE	5 credits
Intelligent instrumentation chain technology	Matière	
Smart Sensor Project	Matière	
IA AVANCEE	UE	5 credits
Loosely supervised learning, RNN	Matière	
Data analysis 2 and classification	Matière	
SOFT AND HUMAN SKILLS 3EA S9	UE	5 credits
Professional English-LV1-Semestre 9	Bloc	
Anglais Scientifique	Matière	
Choix 2 Anglais Professionnel - 3A	Choix	
Anglais Clinique	Matière	
Anglais de Cambridge ou Projet	Matière	
CV Entretiens(3EA)	Matière	
Recherche doc.(3EA)	Matière	
CHOIX Careers and Management 3EA S9	Choix	
Entrepreneurship Project	Matière	
Corporate Project and Social Responsability	Matière	
Semestre 9 - EcoEnergy (EE)	**Choix**	**30 credits**
SYSTEMIC DESIGN	UE	5 credits
System modeling in Bond Graph	Matière	
Eco-design and LCA	Matière	
Hydrogen supply chain	Matière	
Optimization of energy processes and systems	Matière	
SMART-GRIDS	UE	5 credits
Decentralized, embedded electrical networks	Matière	
Energy Hybridization of Systems	Matière	
Smart grids	Matière	
HYDROGEN VECTOR	UE	5 credits
Hydrogen production	Matière	
Hydrogen storage	Matière	
Fuel cells and hydrogen applications	Matière	
Electrochemistry	Matière	
RENEWABLE ENERGIES	UE	5 credits
Wind Power Systems	Matière	
Photovoltaic APP	Matière	
Low-Power Hydroelectric Installations	Matière	

NON ELECTRIC RENEWABLE ENERGIES	Élément constitutif	5 credits
Biofuel systems	Matière	
Valorisation Biomasse Haute Température	Matière	
Renewable heat	Matière	
GENERAL TRAINING	UE	5 credits
Professional English-LV1-Semestre 9	Bloc	
Anglais Scientifique	Matière	
Choix 2 Anglais Professionnel - 3A	Choix	
Anglais Clinique	Matière	
Anglais de Cambridge ou Projet	Matière	
Themed Day: Energy and Sustainable Development	Matière	
Semestre 9 - Impact Entrepreneurship Low to Deep Tech 3EA	**Choix**	**30 credits**
Choix UE Hard Skills 3EA Parcours Impact Entrepreneurship	Bloc	
Choix UE Parc. InSys Parc. Impact Entrepreneurship	Choix	
ADVANCED DIGITAL ELECTRONICS	UE	5 credits
FPGA system design for signal processing	Matière	
Circuit testing and fault simulation	Matière	
POWER MANAGEMENT	UE	5 credits
Microprocessor Power Supply	Matière	
MOSFET Driver Circuits	Matière	
EMC for SMPS	Matière	
FEM Modeling of Integrated passive filters	Matière	
ADVANCED RADIOFREQUENCY ELECTRONICS	UE	5 credits
RF equipment	Matière	
MMIC	Matière	
MEMS	Matière	
ANALOG ELECTRONIC SYSTEMS IN RADIOFREQUENCIES	UE	5 credits
Optoelectronic Components and Circuits	Matière	
Filter Synthesis	Matière	
Integrated photonics	Matière	
Internet of Things	Matière	
DIGITAL SYSTEMS	UE	5 credits
Synthesis strategy	Matière	
EMC for integrated circuits	Matière	
System on Chip	Matière	
ANALOG AND DIGITAL SYSTEMS	UE	5 credits
ADC and DAC	Matière	
Space Embedded Systems Conferences	Matière	
Integration of instrumentation chains	Matière	
Reliability of embedded systems	Matière	
APPROFONDISSEMENT ANALOGIQUE	UE	5 credits
Introduction to Cadence Layout XL / Spectrum	Matière	
Analog ASIC project	Matière	
Choix UE Parc. SysCom Parc. Impact Entrepreneurship	Choix	
ADVANCED RADIOFREQUENCY ELECTRONICS	UE	5 credits

RF equipment	Matière	
MMIC	Matière	
MEMS	Matière	
PROPAGATION PHENOMENA AND RADAR	UE	5 credits
Actual propagation of electromagnetic waves	Matière	
Electromagnetic diffraction analysis / Radar equipment	Matière	
Radar project	Matière	
APPLIED PHYSICS AND NUMERICAL METHODS	UE	5 credits
Electromagnetism and multiscale devices	Matière	
Multiphysics Models	Matière	
Electromagnetism and nanoelectronics	Matière	
Synthesis of High Frequency Equivalent Electrical Circuits	Matière	
HIGH FREQUENCY EMBEDDED SYSTEMS	UE	5 credits
Microwave and Optical Sensors	Matière	
HF optoelectronic components and circuits	Matière	
Internet of Things	Matière	
Passive high frequency devices in waveguide technology	Matière	
MICROWAVE CIRCUITS AND ELECTROMAGNETIC COMPATIBILITY	UE	5 credits
Antenna networks	Matière	
Space antennas	Matière	
Aeronautical EMC 1	Matière	
Space Embedded Systems Conferences	Matière	
Microwave power amplifiers	Matière	
Aeronautical EMC 2	Matière	
MODELING	UE	5 credits
Variational methods for solving partial differential equations of physics	Matière	
Integral methods	Matière	
Plasma physics and applications	Matière	
Choix UE Parc. ACISE Parcours Impact Entrepreneurship	Choix	
SYSTEMS CONTROL, FILTERING AND DIAGNOSTIC	UE	5 credits
Filtering estimation	Matière	
System Monitoring and Diagnostics	Matière	
Multidimensional Systems	Matière	
OPTIMISATION DES SYSTEMES ET LEUR COMMANDE	UE	5 credits
Robust control	Matière	
Optimal Control	Matière	
Combinatorial optimization	Matière	
Opti TER	Matière	
Linear programming and unimodularity	Matière	
Continuous optimization	Matière	
MODELING, ANALYSIS, SIMULATION OF DISCRETE SYSTEMS	UE	5 credits
Modeling and analysis of discrete systems	Matière	
Simulation of discrete event systems	Matière	
Planning and Scheduling	Matière	
Hybrid Dynamic Systems	Matière	
Flexible Workshop TER	Matière	

ADVANCED CONTROLLED SYSTEMS	UE	5 credits
Adaptive and predictive controls	Matière	
Aeronautical systems	Matière	
Robotics: Modeling and Control	Matière	
Advanced Control TER	Matière	
Electrical Systems Control	Matière	
ADVANCED CRITICAL COMPUTING SYSTEMS	UE	5 credits
IT Security	Matière	
IT operational security	Matière	
Safety Testing and Evaluation	Matière	
Development of critical computer systems	Module	
Choix UE Parc.CERE Parcours Impact Entrepreneurship	Choix	
POWER SYSTEMS AND NETWORKS	UE	5 credits
System design	Matière	
Static Converters for power network conditioning	Matière	
Static Converters HVDC Networks	Matière	
CVS DESIGN	UE	5 credits
CVS Design	Matière	
CVS control	Matière	
Architecture and Control TER	Matière	
Power Electronic Technology	Matière	
STATIC CONVERTER AND ADVANCED SYSTEMS	UE	5 credits
CVS reliability	Matière	
EMC	Matière	
X. Levels	Matière	
Switching and functional integration	Matière	
ACTUATORS AND GENERATORS	UE	5 credits
Actuator control	Matière	
Actuator Control TER	Matière	
Multidimensional Systems	Matière	
Conception avancée des actionneurs et générateurs	UE	
SMARTGRIDS AND MICROGRIDS	UE	5 credits
Autonomous networks	Matière	
Sources, reversibility, storage	Matière	
Smart grids	Matière	
1/2 Themed days	Matière	
Choix UE Parc. EMA Parcours Impact Entrepreneurship	Choix	
PHYSICS FOR MECHATRONICS	UE	5 credits
Advanced phenomena in electromechanical conversion	Matière	
Introduction to Magnetohydrodynamics	Matière	
Modeling of coupled phenomena	Matière	
NUMERICAL METHODS AND OPTIMISATION	UE	5 credits
Finite element numerical modelling	Matière	
Optimal control	Matière	
Optimised sizing of electrical machines	Matière	
Numerical modelling of machines	Matière	

DESIGN OF ELECTROMECHANICAL SYSTEMS	UE	5 credits
Design elements of static converters	Matière	
Mechanical design of actuators and generators	Matière	
Introduction to CAD	Matière	
Electric Generators	Matière	
ARCHITECTURES OF MECHATRONIC SYSTEMS	UE	5 credits
Multidimensional Systems	Matière	
Electric actuator control strategy	Matière	
TER Electric Actuator Control	Matière	
Electromagnetic compatibility	Matière	
Filtering estimation	Matière	
APPLIED MECHATRONICS	UE	5 credits
TER Advanced Control (EMA)	Matière	
Elastic metamaterials and actuators for space (Universeh)	Matière	
Winding techniques for electrical machines	Matière	
System Monitoring and Diagnostics	Matière	
Choix UE Parc. PN Parcours Impact Entrepreneurship	Choix	
METHODES NUMERIQUES ET OPTIMISATION-2	UE	5 credits
Optimal control	Matière	
High Performance Computing	Matière	
Similation Numérique en optique	UE	
Topological Optimisation	Matière	
Finished volumes	Matière	
METHODES NUMERIQUES POUR LES PROBLEMES DE DIFFRACTION	UE	5 credits
Integral methods	Matière	
Electromagnetic diffraction analysis / Radar equipment	Matière	
Integral methods	Matière	
CEM ET MATHEMATIQUES APPLIQUEES	UE	5 credits
Multiphysics Models	Matière	
Variational methods for solving partial differential equations of physics	Matière	
Aeronautical EMC 1	Matière	
Electromagnetic compatibility	Matière	
High Performance Computing	Matière	
PHYSIQUE POUR LA MECATRONIQUE - PN	UE	5 credits
Plasma physics and applications	Matière	
Advanced phenomena in electromechanical conversion	Matière	
Modeling of coupled phenomena	Matière	
Introduction to Magnetohydrodynamics	Matière	
HIGH PERFORMANCE COMPUTING	UE	5 credits
Advanced Languages for programming	Matière	
Advanced Techniques for Scientific computing	Matière	
Meshing, Pre and Post Processing	Matière	
Choix UE Parc. EE Parcours Impact Entrepreneurship	Choix	
SYSTEMIC DESIGN	UE	5 credits
System modeling in Bond Graph	Matière	
Eco-design and LCA	Matière	

Hydrogen supply chain	Matière	
Optimization of energy processes and systems	Matière	
SMART-GRIDS	UE	5 credits
Decentralized, embedded electrical networks	Matière	
Energy Hybridization of Systems	Matière	
Smart grids	Matière	
RENEWABLE ENERGIES	UE	5 credits
Wind Power Systems	Matière	
Photovoltaic APP	Matière	
Low-Power Hydroelectric Installations	Matière	
GENERAL TRAINING	UE	5 credits
Professional English-LV1-Semestre 9	Bloc	
Anglais Scientifique	Matière	
Choix 2 Anglais Professionnel - 3A	Choix	
Anglais Clinique	Matière	
Anglais de Cambridge ou Projet	Matière	
Themed Day: Energy and Sustainable Development	Matière	
Choix UE Parc. IATI Parcours Impact Entrepreneurship	Choix	
SIGNAL AND APPLICATIONS	UE	5 credits
Antenna processing	Matière	
Automatic speech processing	Matière	
Audio et musique	Matière	
Satellite navigation	Matière	
AI AND HARDWARE	UE	5 credits
Edge computing	Matière	
Design of NN dedicated to embedded systems	Matière	
IMAGE - APPLICATIONS	UE	5 credits
Computational imaging	Matière	
Computational medical imaging	Matière	
Teledetection	Matière	
LEARNING AND DECISION	UE	5 credits
Data analysis	Matière	
Unsupervised learning	Matière	
Supervised learning	Matière	
EMBEDDED SYSTEMS	UE	5 credits
System on Chip	Matière	
Architecture and hardware acceleration for DL	Matière	
AI AND SENSORS	UE	5 credits
Intelligent instrumentation chain technology	Matière	
Smart Sensor Project	Matière	
IA AVANCEE	UE	5 credits
Loosely supervised learning, RNN	Matière	
Data analysis 2 and classification	Matière	
VISION, AUGMENTED REALITY AND APPLICATIONS	UE	5 credits
Computer vision and augmented reality	Matière	
Transversal project	Matière	

SOFT SKILLS 1 - PARTNERSHIPS	UE	5 credits
UT ou TBS ou TSM 1 - module 18h	Matière	
UT ou TBS ou TSM 2 - module 18h	Matière	
UT ou TBS ou TSM 3 - module 18h	Matière	
SOFT SKILLS 2 - DESIGN THINKING	UE	5 credits
Design Thinking 1 - module 15h	Matière	
Design Thinking 2 - module 18h	Matière	
Professional Communication and English - module 21h	Matière	
SOFT SKILLS 3 - PROJET DEEP TECH & APPLICATIONS	UE	5 credits
PDT & CU 1 - module 18h	Matière	
PDT & CU 2 - module 18h	Matière	
PDT & CU 3 - module 18h	Matière	

Semestre 10 3EA à N7

	Nature	CM	TD	TP	Crédits
Projet Fin d'Etude 3EA sans Projet Long	UE				30 credits
Stage 2A 3EA	Matière				6 credits
PFE 3EA sans PL	Stage				24 credits
PFE 3EA avec Projet Long	UE				30 credits
Stage 2A 3EA	Matière				6 credits
Projet Long 3EA	UE				8 credits
Projet de Fin d'Etudes 3EA	UE				22 credits