

DOUBLE-DEGREE Program 1A – 2A

Semester S5		
Course Title	Nb h	ECTS
ECS - Electrical energy and Systems Control		6
ECS tc 0 Autonomous work	24	
ECS tc 1 Electrical Energy	32	
ECS tc 2 Linear Control	32	
ECS tc 3 Control and Electric Drive	8	
FLE - Fluids and Energy		6
FLE tc 0 Academic support FLE	-	
FLE tc 1 Sensibilisation and theory	60	
FLE tc 2 Experimental and numerical methods	14	
FLE tc 3 Thematic Project	22	
MTH - Mathematics		6
MTH tc 3 Probability theory and Statistics	28	
MTH tc 4 Optimization	18	
MTH tc 5 Adapted Mathematics I : Applied Analysis	20	
MTH tc 6 Adapted maths II : Algebra and Numerical Analysis	32	
PRO S5 - The engineering Profession		5
PRO tc 1 Conferences	4	
PRO tc 5 Sport and Physical Education	25	
PRO tc 6 Study Project (PE)	50	
PRO tc 7 Career plan - tutoring	1	
SEM - Economics and Business Administration		5
SEM tc 1 Economics	32	
SEM tc 2 Business Administration	32	
Modern Languages S5		
LV tc F1 French	From 40 to 60	2
LV Other language (<i>optional - for non-beginner students in French</i>)- 2 credits per language	30	
TOTAL	Minimum	30

Semester S6

Course Title	Nb h	ECTS
Mechanical Engineering		6
GM tc 1 Technology - Mechanics - Strength of Materials	46	
GM tc 2 Practical Activities in Mechanical Engineering	30	
GM tc 3 Modelling and Design Or GM tc 4 Mechanism Design	20	
Computer Science		6
INF tc 1 Algorithms and Data structures : Design, analysis and implementation	32	
INF tc 2 Object-Oriented Design and Programming	32	
INF tc 3 WebApp Lab	32	
Mechanics of Solids and Structures		6
MSS tc 1 Elastic Solid Mechanics	32	
MSS tc 2 Continuum solid mechanics - experiments	20	
MSS tc 3 Digital Mock-up	20	
MSS tc 4 Structures Dynamics	24	
MSS tc 5 Plasticity and Metal Forming	24	
PRO S6 - The engineering Profession		4
PRO tc 1 Conferences	5	
PRO tc 2 Discovering engineering	4	
PRO tc 3 Company visits	8	
PRO tc 5 Sport and Physical Education	25	
PRO tc 6 Study Project (PE)	50	
PRO tc 7 Career plan - tutoring	1	
Information Science and Techniques		6
STI tc 0 Autonomous work	2	
STI tc 1 Electronic systems	36	
STI tc 2 Signal Processing	34	
STI tc 3 Analog to Digital Conversion	8	
Modern Languages S6		
LV tc F1 French	From 30 to 60	2
LV Other language (<i>for non-beginner students in French</i>) – 2 credits per language	30	
Execution training		
STE tc4 Blue-collar internship: 1 month minimum	140	
TOTAL	Minimum	30

Semester S7

Course Title	Nb h	ECTS
IDM - Materials Engineering		6
IDM tc 1 From Matter to Materials: Structure and Properties	54	
IDM tc 2 Practical courses in Material and Surface Science	40	
IDM tc 3 Transversal Activity IDM / PCM	2	
PCM - Physics and Chemistry of Matter		6
PCM tc 1 Physics	43	
PCM tc 2 Chemistry	27	
PCM tc 3 Lab Sessions PCM	24	
PCM tc 3 Transversal Activity IDM / PM	2	
PRO S7 - The engineering Profession		5
PRO tc 1 Conferences	-	
PRO tc 5 Sport and Physical Education	24	
PRO tc 7 Career Plan - Tutoring	1	
PRO tc 8 Industrial Application Project (PAi)	43	
Or : PRO tc 9 Research Project (PAr)	43	
SHS - Humanities and social sciences		5
SHS tc 1 Social Sciences	34	
SHS tc 2 Organisational analysis	16	
SHS tc 3 Ethics	10	
In-depth Courses		6
ECS / INF / MTH / STI : one class among 8 elective classes	48	
FLE / GM / IDM / MSS / PCM : one class among 8 elective classes	48	
Modern Languages S7		
LV F2 French as a Foreign Language	From 30 to 40	2
LV Other language (<i>optional</i>) – 2 credits per language	30	
TOTAL	Minimum	30

Semester S8		
Course Title	Nb h	ECTS
U.E. Optional Courses		15
ELC 1	32	
ELC 2	32	
ELC 3	32	
ELC 4	32	
ELC 5	32	
PRO S8 - The engineering Profession		4
PRO tc 1 Conferences	4	
PRO tc 5 Sport and Physical Education	16	
PRO tc 7 Career plan - tutoring		
PRO tc 8 Industrial Project (PAi)	25	
Or : PRO tc 9 Research Project (PAr)	25	
Modern Languages S8		1
LV F2 French as a Foreign Language	16	
LV Other language (<i>optional</i>) – 2 credits per language	16	
Application Training		10
STA tc4 Application Training : 3 months minimum	420	
TOTAL		30

In-depth Courses 1 S7 – ECS-INF-MTH-STI (16-17 programs)

Course Title	Nb h	ECTS
ECS	160	15
ECS a 1-FH Power Electronics	42	
ECS a 2-FH Electromechanic Conversion	48	
ECS a 3-EG Design and Optimization of Electromagnetic Devices	36	
ECS a 4-EG Multi-sensor, Multi-activator Control	48	
INF		
INF a 1-FH Multimedia: Concepts and technologies	48	
INF a 2-FH Problem Solving Issues	48	
INF a 3-EG Java application programming	48	
INF a 4-EG Data analysis and pattern recognition	48	
MTH		
MTH a 1-FH Probability theory and introduction to random processes	36	
MTH a 2-FH Partial differential equations	36	
MTH a 3-EG Numerical approximation of ordinary and partial differential equations	36	
MTH a 4-EG Mathematical Statistics and Econometrics	48	
STI		
STI a 1-FH Embedded systems architectures	48	
STI a 2-FH Optimal filtering and Information Transmission	42	
STI a 3-EG Digital computing and information processing architectures	34	
STI a 4-EG Smart Sensor Networks : interface systems	48	
TOTAL		30

In-depth Courses 2 S7 – FLE-GM-IDM-MSS-PCM (16-17 programs)

Course Title	Nb Hours	ECTS
FLE		
FLE a 1-FH Turbulences and instability	48	
FLE a 2-FH Acoustics and Waves in Fluids	48	
FLE a 3-EG Supersonic Flows	44	
FLE a 4-EG Thermal Science and Combustion	48	
GM		
GM a 1-FH Multibody mechanical systems	48	
GM a 2-EG Mechanical Engineering	48	
IDM		
IDM a 1-FH Damage and Ruin of Materials	48	
IDM a 2-FH Materials and Innovative surface treatments	38	
IDM a 3-EG Amorphous Materials for Innovative Functional Structures	30	
IDM a 4-EG Biomechanics of living tissues and biomaterials for prosthesis	46	
MSS		
MSS a 1-FH Vibration Analysis	48	
MSS a 2-EG Inelastic behaviour of structures	48	
PCM		
PCM a 1-FH Quantum mechanics and applications	48	
PCM a 3-EG Electrochemistry and Chemitronic	44	
TOTAL		30

Semester S8 (16-17 programs)

Semester S8 <small>(16-17 programs)</small>		
Optional Teaching Unit : choice of 5 courses (One at most from each group A, B, C, D, E or F) 3 credits per course		15
Course Title <small>(The above is a list of the optional subjects currently offered. For reasons associated with timetabling, staff availability and course popularity, some changes are possible)</small>	number hrs	ECTS
A Courses		3
ECL A-1 Finite element method, theory to implementation	32	
ECL A-2 Software Engineering	32	
ECL A-4 Production and Distribution of Electrical Energy	32	
ECL A-5 Optical methods	32	
ECL A-6 Rotor Dynamics in Mechanical Engineering	32	
ECL A-7 Mechanics of thin structures : plates and shells	32	
ECL A-8 Numerical Methods for Mechanics	32	
ECL A-10 Life, Information and Systems	32	
ECL A-11 Gui Programming in C++	32	
ECL A-12 Social, economic and political issues for a sustainable development	32	
B Courses		3
ECL B-1 Functional analysis, theory and applications	32	
ECL B-2 Collaborative algorithms and applications	32	
ECL B-3 Non destructive testing	32	
ECL B-4 Nuclear Engineering	24	
ECL B-5 Health engineering	32	
ECL B-6 Hydrology and Water Ressources	32	
ECL B-7 Interaction between ground and structures	32	
ECL B-8 Development of technical products	32	
ECL B-9 Political sociology	32	
ECL B-10 Designing a Sustainable Packaging	28	
ECL B-11 introduction to the random vibrations	32	
ECL B-12 Men and their Waste	32	
C Courses		3
ECL C-1 Mathematical tools for biological problems	32	
ECL C-2 Design of microwave circuits and devices	32	
ECL C-3 Interactive design and Fablab practices	32	
ECL C-4 Image sensing and processing	32	
ECL C-5 Observation and Analyse of Materials	30	
ECL C-6 Fundamental soil mechanics	32	
ECL C-7 Multiphysics simulation in mechanical design	32	

ECL C-9 Corporate Finance	32	
D Courses		3
ECL D-1 Probability theory and introduction to random processes	32	
ECL D-2 Adaptative Filtering : Application to Active Noise Control	32	
ECL D-3 Webapps	32	
ECL D-4 Physics and chemistry of surfaces and interfaces	32	
ECL D-5 Two-phase flow in engineering systems related to energy	32	
ECL D-6 PLM Digital Mockup	32	
ECL D-7 Social relationships in company	32	
ECL D-8 Discrete event systems	32	
ECL D-9 Wind Turbines	32	
ECL D-11 Methods for operational research	32	
	32	
E Courses		3
ECL E-1 Algorithms and Reasoning	32	
ECL E-2 Law and Work	32	
ECL E-4 Industrial Processes Engineering	32	
ECL E-5 Selection of Materials	32	
ECL E-6 From microscale to macroscale in mechanics	32	
ECL E-7 Aircraft Turbojets	32	
ECL E-8 Design and manufacture management	32	
ECL E-9 Marketing	32	
ECL E-10 Mechanisms and contacts	32	
F Courses		3
ECL F-1 Market Finance	32	
ECL F-2 Intelligent mecatronics systems	32	
ECL F-3 Insulating Materials for Electrical Engineering	32	
ELC F-4 - Ecology and Environment	32	
ECL F-5 Order within chaos	32	
ELC F-6 Antenna, Signals and Processors	32	
ECL F-7 Entrepreneurship and Innovation	32	
ELC F-9 – Polymer materials : physical properties and innovation	32	
ECL F-10 Globalization and Transculturalities	33	