



Ecole Centrale de Lyon

SECOND year course list

MATTER – MATERIALS teaching unit		96 hours ECTS credits : 7
Core courses		
MMb2.1	Physics II – Atoms and photons	24 hours
MMb2.2	Physics of materials	24 hours
MMb2.3	Synthesis	4 hours
Transfer modules		
MMt2.1	Polymers and composites	12 hours
MMt2.2	Surface and tribology	12 hours
In-depth courses: one per student		20 hours
MMA2.1	Surface processing	
MMA2.2	Non-ordered materials	
MMA2.3	Polymer materials and composites	
MMA2.4	Aerospace and car materials	
MMA2.5	Particle-matter interactions : characterization of materials	
MMA2.6	Electrochemistry and applications	
MMA2.7	Supra-molecular chemistry	
MECHANICS – ENERGETICS teaching unit		148 hours ECTS credits : 7
Core courses and Transfer modules : Solid mechanics		
MEb2.1	Solid mechanics 2	32 hours
MEt2.1	Experimental techniques in solid mechanics	20 hours
Core courses and Transfer modules : Fluid mechanics		
MEb2.2	Heat and mass transfer in fluids	16 hours
MEt2.2	Experimental techniques in fluid mechanics	12 hours
MEt2.3	Experimental techniques in energy	8 hours
Transfer module : Mechanical engineering		
MEt2.4	Design and manufacturing in mechanical engineering	16 hours
Core courses and Transfer modules : Synthesis		
MEb2.3	Mechanics and engineering	4 hours
MEt2.5	Mini-project	16 hours
In-depth courses: one per student		24 hours
MEa2.1	Heat transfer	
MEa2.2	Turbulent flows	
MEa2.3	Hydrodynamic instabilities	
MEa2.4	Vibration of structural systems	
MEa2.5	Vehicle technology	
MEa2.6	Theory of plates and shells	
MEa2.7	Mechanisms	
ELECTRICAL ENGINEERING teaching unit		90 hours ECTS credits : 7
In-depth courses: one per student		90 hours
GEa2.01	Electronic circuits	
GEa2.02	Electronic systems	
GEa2.03	Hertzian telecommunications	
GEa2.04	Optical telecommunication	
GEa2.05	Data acquisition, instrumentation and electronic measurements	
GEa2.06	Data acquisition, microprocessors and microsystems	
GEa2.07	Energy conversion in on-board systems	
GEa2.08	Electro-thermal processes	
GEa2.09	Power generation, transmission and delivery	
GEa2.10	Materials for electrical engineering and applications	
GEa2.11	Electromagnetic device design	
GEa2.12	Control engineering	

MATHEMATICS & COMPUTER SCIENCE teaching unit		108 hours ECTS credits : 7
Core courses		
LSb2.1	Partial differential equations, theoretical and numerical analysis II	40 hours
LSb2.2	Numerical analysis	24 hours
LSb2.3	Object-oriented programming	16 hours
In-depth courses: one per student		16 hours
LSa2.1	Numerical analysis of ordinary differential equations	
LSa2.2	Partial differential equations	
LSa2.3	Practice of numerical methods	
LSa2.4	Computer language processing	
LSa2.5	Algorithm and reasoning	
LSa2.6	Process-based software development	
Transfer module		
LSt2.1	Object-oriented programming lab	12 hours
ECONOMICS AND SOCIAL SCIENCES FOR ORGANISATIONS teaching unit		42 hours ECTS credits : 4
Core courses		
SEb2.1	Human and social sciences	30 hours
In-depth courses: one per student		12 hours
SEa2.01	Cost analysis	
SEa2.02	Marketing	
SEa2.03	Product design management	
SEa2.04	Data flow management	
SEa2.05	Entrepreneurship : how to become an entrepreneur	
SEa2.06	Company finance	
SEa2.07	International trade techniques	
SEa2.08	Social issues	
SEa2.09	Social agents	
SEa2.10	Economic modelling and policy	
THE ENGINEERING PROFESSION teaching unit		491 hours ECTS credits : 21 (of which 5 for the Industrial Placement)
Information gathering to build a professional project		
PRt2.1	Seminars (5)	5 hours
Interacting with others		
PRb2.1	Communication	12 hours
PRb2.2	Ethics	12 hours
PRb2.3	Analysis of organizations	12 hours
PRb2.4	Methods of expression and organization	12 hours
Working together		
PRt2.2	Study Project : group work over 15 months	56 hours
PRt2.3	Industrial study project	50 hours
PRt2.4	Physical education and sport	52 hours
Applying knowledge in a company		
PRt1.7	Industrial Placement : 8 weeks	280 hours

MODERN LANGUAGES teaching unit		54 hours minimum ECTS credits : 3 per language
An2	English	54 hours
Al2	German	54 hours
Es2	Spanish	54 hours
It2	Italian	54 hours
Ru2	Russian	54 hours
Ch2	Chinese	108 hours
Ja2	Japanese	108 – 162 hours
Po2	Brazilian Portuguese	54 hours
Fr2	French as a foreign language	54 to 216 hours
OPTIONS four to be chosen (one from each group)		80 hours ECTS credits : 4, to be added to relevant teaching unit
Group A		
A1 LSo2.4	Image analysis and indexing	20 hours
A2 MEo2.01	Combustion	20 hours
A3 GEo2.2	Non-Destructive Control	20 hours
A4 SEo2.2	Company law	20 hours
A5 LSo2.2	Non-linear problems in mechanics and physics	20 hours
A6 SEo2.1	International economics - geostrategy	20 hours
A7 MMo2.6	Nuclear engineering	20 hours
A8 MEo2.07	Introduction to architecture	20 hours
A9 MMo2.1	Semiconductor materials	20 hours
Group B		
B1 MEo2.02	CAD – Digital mock-up	20 hours
B2 GEo2.3	Programmable networks and circuits	20 hours
B3 MMo2.2	Technical product elaboration	20 hours
B4 MEo2.05	Compressible fluid flow	20 hours
B5 SEo2.4	Knowledge management	20 hours
B6 MMo2.7	Optical methods	20 hours
B7 LSo2.1	Theoretical and practical aspects of the finite element method	20 hours
B8 LSo2.5	Information systems	20 hours
Group C		
C1 MMo2.3	Ecology and the environment	20 hours
C2 MMo2.5	Choice of materials	20 hours
C3 MEo2.03	Order within chaos : engineering applications	20 hours
C4 LSo2.3	Stochastic processes and applications	20 hours
C5 GEo2.4	Electrical energy generation and network	20 hours
C6 SEo2.3	Risk and crisis management	20 hours
C7 MEo2.09	Structure analysis and stability	20 hours
C8 LSo2.6	Server-side web technology	20 hours
C9 MEo2.06	Gas turbine theory and design	20 hours
Group D		
D1 MEo2.10	Numerical computation of coupled systems	20 hours
D2 GEo2.5	Adaptive filtering applied to active control	20 hours
D3 MEo2.04	Hydrology	20 hours
D4 MMo2.4	Industrial engineering process	20 hours
D5 MEo2.08	Soil mechanics	20 hours
D6 SEo2.5	Science, technology and society	20 hours
D7 LSo2.7	Operating systems	20 hours
D8 GEo2.1	Measurement techniques for high tension	20 hours

