

Engineering Curriculum

Louis de Broglie Engineering School

1st Year

Graduate Engineering

Acquiring Technical Skills, Basic Scientific and General Education

To develop a sound foundation in maths, physics, computer science and technology and the general and professional knowledge in foreign languages, economics, liberal arts and project management.

1ST SEMESTER

MATHEMATICS 47h

(18h courses, 29h laboratory courses) **3 ECTS**

Linear Algebra – Signal processing : probabilities, Fourier series

PHYSICS 44h

(17h courses, 27h lab courses) **3 ECTS**

Thermodynamics

ELECTRONICS AND WAVES 57h

(17h courses, 16h lab courses, 24h lab work) **4 ECTS**

Analog Electronics – Acoustics

COMPUTER SCIENCE 49h

(14h courses, 7h lab courses, 28h lab work) **4 ECTS**

C Language Programming

NUMERICAL SIMULATION 43h

(15h courses, 14h lab courses, 14h lab work) **3 ECTS**

Numerical Analysis – Operational Research

MECHANICS 89h

(30h courses, 45h lab courses, 14h lab work) **5 ECTS**

Mechanical Design

ENGINEERING GENERAL KNOWLEDGE 65h

(24h courses, 39h lab courses, 2h lab work) **2 ECTS**

Company procedures – Industrial Management – Patent Rights – Purchasing – Methods 1 – General Knowledge 1 – Risk Analysis – Fostering – 2nd Foreign Language (optional).

ENGLISH 34h

(14h lab courses, 13h workshop, 7h lab) **2 ECTS**

English 1 – Language lab 1.

SUPERVISED PERSONAL ELECTIVES 7h supervised work **2 ECTS**

BLUECOLLAR INTERNSHIP **2 ECTS**

(10h courses lab, 3h lab work, 4 weeks in a company)

2ND SEMESTER

MATHEMATICS 78h

(37h courses, 41h lab courses) **4 ECTS**

Holomorphic Functions–Z Transforms – Partial Differential Equations– Statistics– Signal Processing : Random Signal, Filtering.

PHYSICS 63h

(30h courses, 26h lab courses 7h lab work) **4 ECTS**

Physical Chemistry – Quantum Mechanics.

ELECTRONICS AND WAVES 48h

(22h courses, 26h lab course) **3 ECTS**

Electromagnetics.

COMPUTER SCIENCE 40h

(12h courses 14h lab courses, 14h lab work) **2 ECTS**

Sequential and Combinational Logic

NUMERICAL SIMULATION 70h

(16h courses, 9h lab courses, 15h lab work, 30h project) **5 ECTS**

Optimization — Project.

MECHANICS 41h

(17h course, 22h lab courses, 2h lab work) **2 ECTS**

Power Transmission

ENGINEERING GENERAL KNOWLEDGE 41h

(5h courses, 20h lab courses, 16h lab work) **2 ECTS**

Vocational Training – Methods 2 – Innovation 2 – General Knowledge 2 – Foreign Language (optional).

ENGLISH 34h

(14h lab courses, 13h, 7h language lab) **2 ECTS**

English 2 – Language lab 2.

MENTORING **1 ECTS**

SUPERVISED PERSONAL ELECTIVES **2 ECTS**

17h supervised work

INTERNSHIP ABROAD **3 ECTS**

Summary of the 1st year:

Length of studies (in hours)	Courses	Lab Courses	Lab work	Supervised projects Speaking workshops	Total	ECTS	Internships
1 st semester	135	201	92	20	448	30	4 weeks
2 nd semester	139	172	61	60	432	30	12 weeks

Learning to be a professional

To develop a specific knowledge foundation in the four technical fields, Automated Production Science, Professional Electronics, Computer Science, Material Science. To highlight the essential role of man' within the company : to help the students understand the 'how to' of managing a project, a team, a company, to know and understand those things that can hinder or undermine a successful project, to teach the importance of teamwork as a factor in helping a person and/or a company achieve its goals

1ST SEMESTER

PRODUCTION SCIENCE 56h
(26h courses , 30h lab courses) **4 ECTS**

Mechanics : Statics, Material Resistance– Design and Quality Control : Innovation, Value Analysis, Quality Tools.

ELECTRONICS 62h
(30h courses, 25 lab courses, 7h lab work) **4 ECTS**

Modulation and Demodulation – Wave Emissions – Signal Processing

COMPUTER SCIENCE 69h
(27h courses, 14h lab courses, 28h lab work) **4 ECTS**

Object-oriented Programming : Java , Software Engineering, - Data Analysis.

MATERIAL SCIENCE 47h
(30h courses, 17h lab courses) **4 ECTS**

Solid Physics – Metallurgy.

INDUSTRIAL PROJECT 50 supervised h 5 ECTS
and at least 20 h of individual work

Work in pairs on an issue given by an industrial client in a company.

THE ENGINEERING GENERAL KNOWLEDGE 80h
(22h courses, 53h lab courses, 5h lab work) **4 ECTS**

Project Management –Mentoring – Accounting and Management Control – General Knowledge 1 – International Marketing – Career Objectives – 2nd Foreign Language (optional).

ENGLISH 41h
(41h lab courses) **2 ECTS**

TOEIC 1. Preparation

SUPERVISED PERSONAL ELECTIVES 3 ECTS
6h supervised work
(6h lab courses and at least 80h of personal work)

2ND SEMESTER

PRODUCTION SCIENCE 62h
(16h courses, 15h lab courses, 31h lab work) **4 ECTS**

Dynamics : Structural Dynamics – Drivers : motors, robots – Design & Quality : CAD

ELECTRONICS 65h
(28h courses, 16h lab courses, 21h lab work) **4 ECTS**

Digital Communication – Wave Reception

COMPUTER SCIENCE 133h
(52h courses, 36h lab courses, 45h lab work) **6 ECTS**

Numerical Resolution of ODE – Data Bases Computer Architecture – Systems Simulation – Automation, Servocontrollers – Control System with State Space

MATERIAL SCIENCE 64h
(28h courses, 5h lab courses, 31h lab work) **4 ECTS**

Semiconductors Physics– Industrial Materials Properties.

INDUSTRIAL PROJECT 60 supervised h 6 ECTS
Ant at least 45h of personal work

Pair work on an issue given by an industrial client in a company.

THE ENGINEERING GENERAL KNOWLEDGE 40h
(12h courses, 24h lab courses, 4h lab work) **1 ECTS**

Project Management – General Knowledge 2 – 2nd Foreign Language (optional).

ENGLISH 38h
(38h lab courses) **1 ECTS**

TOEIC 2 Preparation or Professional English
TOEIC 3h 1 ECTS

SUPERVISED PERSONAL ELECTIVES 3 ECTS
6h supervised work

(6h lab courses and at least 80h of personal work)
INTERNSHIP (optional)

Summary of the 2nd year:

Length of studies (in hours)	Courses	Lab Courses	Lab Work	Supervised projects	Total	ECTS	
1 ^{er} semestre	135	186	40	50	411	30	
2 ^{eme} semestre	139	143	132	60	47	30	

Career Objectives and the Professional World

To develop expertise and career objectives. Half of the year takes place in the form of an internship in a company. Education is as follows : a core course in high tech technologies and an optional module in one of the four fields of the school.

◆ PRODUCTION/ MATERIAL SCIENCE 1^{RST} SEMESTER

20 Week- Internship + seminar 29 + 1 ECTS

The diploma work, which takes place in a company is the time when the student applies for the first time his/her professional skills. She/he puts in practice the knowledge, skills and methods they have acquired in order to fulfill the tasks entrusted to them by the firm's executive who supervises the trainee. Their mission is typically that of a beginning engineer. The school follows the progress of the trainee and at the end of his/her activity, the school grades, both the report he/she has written and the oral presentation he/she has to make in front of an examination board. This internship may last up to 12 months.

2ND SEMESTER

CORE COURSE 171h

(133 courses, 5h courses lab, 33h lab work) 8 ECTS

Communication Networks (24h) – Semiconductors Technology (18h) – Finite Elements, CATIA CAD, (10h) – Process Identification (14h)– Production and Inventory Control (21h) – Vision and Image Processing 28h)– English (22h) – Engineering General Knowledge (34h).

PROFESSIONAL PROJECT 13h 2 ECTS

Job Hunting Techniques (Self-Assessment, Data Collecting, Interviewing), – Interview Training

TECHNICAL PROJECT 100 supervised h 10 ECTS And at least 145h of personal work

Carried out by students and Supervised by a Louis de Broglie Professor (project for a company or one of the a School's Labs)

PRODUCTION SCIENCE : optional course 205h (85h courses, 37h courses lab, 41h lab work, 42h project) 10 ECTS

Industrial Engineering -: Supply chain , Organisation, Industrial Management , Quality Control , Maintenance, Security , Ergonomics (75h) – Materials Forming (42h) – Sensors and Actuators (46h) – Applied Project (42h).

MATERIAL SCIENCE : optional course 205h (101h courses, 3h courses lab, 61h lab work , 40h project) 10 ECTS

Polymers (10h) – Composites : New Structural Materials and Materials Resistance applied to Composite Structures (31h)– Ceramics (23h) – Semi-conductive Materials (15h) –Thin-

film Materials and Characterization (61h) – Lasers and applications (14h) – Materials - Applied Project (51h).

◆ TELECOMMUNICATIONS / SIMULATION 1^{RST} SEMESTER

TELECOMMUNICATIONS ET DETECTION : optional course 205h

(101h courses 40h lab courses, 14h lab work , 50h project) 10 ECTS

Propagation and Digital Communications (30h) – Digital Transmission Applications (16h) – Electrical RadioAntennas (16h) – Radar Systems (15h) – Submarine Acoustics (20h) – Hyper frequency Links (13h) – Optronics (20h) – Optical Fiber Transmission (17h) – CAD Electronics (8h) – Applied Project (50h).

SIMULATION : optional course 205h

(57h courses, 18h lab courses, 40h lab work, 90h project) 10 ECTS

Computer Security (30h) – Web Dynamics (17h) – CAD Electronics VHDL (8h) – Conferences : Hardware acquisition strategy, mobile Internet, Web Services, Web Hosting etc. (23h) – Application Project : Project Management Software Engineering, Algorithmic, Object oriented Programming (90h + 37h courses).

TECHNICAL PROJECT 100 supervised h 10 ECTS And at least 145h of personal work

Carried out by students and Supervised by a Louis de Broglie Professor (project for a company or one of the a School's Labs)

CORE COURSE 171h

(133 courses, 5h courses lab, 33h lab work) 8 ECTS

Communication Networks (24h) – Semiconductors Technology (18h) – Finite Elements, CATIA,10h) – Process Identification (14h)– Production and Inventory Control(21h) – Vision and Image Processing 28h)– English (22h) – General Engineering Knowledge (34h)

PROFESSIONAL PROJECT 13h 2 ECTS

Job Hunting Techniques (Self-Assesment -Data collecting, Interviewing), – Interview Training

2^{EME} SEMESTER

20 Week-Internship + Seminar 29 ECTS +1ECTS* * IDEM

Summary of the 3rd year :

Length of studies (en hours)	Courses	Lab Courses	Lab Work	Project	Total (supervised education)	ECTS	Internship
Teaching (1 st ou 2 nd semester)	206	30	85	168	489	30	
Internship (1 st ou 2 nd semester)						30	20 weeks min

Program of Studies : Major Orientations

Scientific and Technical Education

The curriculum encompasses 4 technical fields often linked in industry as Aeronautics, Telecommunications, Car Industry, Data Processing :

- Production Science : applied to Mechanics, Strength of Materials, Robotics, Automation, Sensors and Methods, Leading Current Production Processes
- Electronics : applied to Telecommunications and Detection
- Computer Science applied to real-time Systems and Numerical Simulation
- Material Science: applied to New Materials in Industry

Corporate Life Education

Throughout their curriculum, students work « hand in hand » with industry.

- Mentoring : from the beginning of their engineering studies, all students have mentors in companies. They meet their mentor at least 6 times over their schooling years. Thus they learn what exactly the life of an engineer involves and they have a privileged relationship/contact in the industrial world
- Industrial Projects: In the second year of the engineering curriculum, the students work in pairs on a project for a company : it involves working to find the best possible solutions to a project identified by a company (analysing the client's needs, managing resources, offering solutions and providing/presenting results).
- Internships : During their curriculum, the students carry out at least 3 internships (a one-month blue-collar internship, a 3-month internship abroad and a 6-month engineering internship)
- Sandwich Year in a Company : this option consists of a 12-month student internship where the student does the work of a beginning engineer within a company in France or abroad.
- Community Life enables students the opportunity to develop their interest in entrepreneurship

Human Values and Corporate Life Training

The mission of Louis de Broglie Engineering School is to

- Highlight the essential role of man within the company
- Help the students understand the “how to of managing a project, a team, a company,
- Know and understand those things that can hinder or undermine a successful project
- Teach the importance of teamwork as a factor in helping a person and or a company to achieve its goal.

All engineering students experience project management through technical projects and internships , through community life. They are trained to industrial corporate life, work patterns and flows within a company, teambuilding, communications skills, innovation, finding out and screening information, carrying out meaningful jobs.
