Courses taught in English.

Sector: science and technology
LEGENDE
-

- **BACHELOR (LICENCE 1)**
- **BACHELOR (LICENCE 2)**
- **BACHELOR (LICENCE 3)**
- **MASTER 1**
- **MASTER 2**
MATHEMATICS
HIGH PERFORMANCE COMPUTING - SCIENTIFIC CALCULATION
Level: MASTER 2

SEMESTER: AUTUMN

- REFRESHER COURSE IN NUMERICAL METHODS
  5 CRÉDITS (ETCS)

- REFRESHER COURSE IN ALGORITHMS AND COMPUTATION
  5 CRÉDITS (ETCS)

- REFRESHER COURSE IN MODELING
  5 CRÉDITS (ETCS)

- SEMINAR
  2 CRÉDITS (ETCS)

- MATHEMATICAL TOOLS FOR THE SIMULATION
  7 CRÉDITS (ETCS)

- SUPERCOMPUTING
  7 CRÉDITS

- INTERNATIONAL ENTERPRISE PROJECT MANAGEMENT, EMPLOYMENT LAW AND SOCIAL SECURITY LAW
  4 CRÉDITS (ETCS)

SEMESTER: SPRING

- SCIENTIFIC COMPUTING FOR MECHANICS
  5 CRÉDITS (ETCS)

- SCIENTIFIC COMPUTING FOR ELECTROMAGNETIC FIELD COMPUTATION
  5 CRÉDITS (ETCS)

- SCIENTIFIC COMPUTING FOR BIOINFORMATICS
  5 CRÉDITS (ETCS)

- FROM MODELING TO NUMERICAL SIMULATION
  5 CRÉDITS (ETCS)

- SCIENTIFIC COMPUTING FOR COMPUTER SCIENCE
  5 CRÉDITS (ETCS)

- SCIENTIFIC COMPUTING FOR NON LINEAR OPTICS AND PHOTONICS
  5 CRÉDITS (ETCS)

- SCIENTIFIC COMPUTING FOR OPTIMIZATION
  5 CRÉDITS (ETCS)

- SCIENTIFIC COMPUTING FOR MATERIAL SCIENCE
  5 CRÉDITS (ETCS)
PHYSICS
ATMOSPHERE ENVIRONMENT
Level: MASTER 2

SEMESTER: AUTUMN

- ELECTRONIC STRUCTURE AND VIBRATION-ROTATION SPECTROSCOPY
  30 CRÉDITS (ETCS)

- ADVANCED ANALYSIS METHODS OF ATMOSPHERIC SPECIES
  30 CRÉDITS (ETCS)

- RADIATIVE TRANSFER IN THE ATMOSPHERE
  30 CRÉDITS (ETCS)

- REACTIVITY IN HOMOGENEOUS AND HETEROGENEOUS PHASES
  30 CRÉDITS (ETCS)

- PHYSICS AND CHEMISTRY OF THE ATMOSPHERE
  30 CRÉDITS (ETCS)

- SPECTROSCOPIC AND OPTICAL METHODS
  30 CRÉDITS (ETCS)

- OBSERVATION SYSTEMS FOR ATMOSPHERIC COMPOSITION
  30 CRÉDITS (ETCS)

- RECHERCHE EN LABORATOIRE
  30 CRÉDITS (ETCS)
COMPUTER SCIENCE AND ELECTRONICS

ELECTRICAL ENGINEERING FOR SUSTAINABLE DEVELOPMENT (E2SD)

Level: MASTER 2

SEMESTER: AUTUMN

- English and Communication 3
  5 CRÉDITS (ETCS)

- BIBLIOGRAPHIC RESEARCH PROJET
  5 CRÉDITS (ETCS)

- ELECTROMAGNETIC CONVERSION AND ECO-DESIGN
  5 CRÉDITS (ETCS)

- ENERGY CONVERSION
  5 CRÉDITS (ETCS)

- SUSTAINABLE DEVELOPMENT APPLICATIONS
  5 CRÉDITS (ETCS)

- ADVANCED TRANSPORTATION SYSTEMS
  5 CRÉDITS (ETCS)

- ELECTRICAL SYSTEM AND RENEWABLE ENERGY PRODUCTION
  5 CRÉDITS (ETCS)

SEMESTER: SPRING

- TRAINING
  20 CRÉDITS ETCS

- PROJECT
  10 CRÉDITS ETCS
COMPUTER SCIENCE
DATA SCIENCE
Level : MASTER 1

SEMESTER : AUTUMN

- **(OPTIONAL) REFRESHER IN MATHS AND COMPUTER SCIENCE**
  3 CREDITS (ETCS)

- **MACHINE LEARNING**
  3 CREDITS EACH (ETCS)
  EC1: MACHINE LEARNING 1, HANDS ON
  EC2: MACHINE LEARNING 2, THE LANDSCAPE OF MACHINE LEARNING

- **MATHEMATICS FOR DATA SCIENCE 1**
  3 CREDITS EACH (ETCS)
  EC1: FUNDAMENTAL NOTIONS OF MATHEMATICS
  EC2: PROBABILITY 1
  EC3: STATISTICS 1

- **COMPUTER SCIENCE 1**
  3 CREDITS EACH (ETCS)
  EC1: DATABASES 1
  EC2: ALGORITHMS AND THEIR COMPLEXITY 1

- **TOOLS, PROJECTS & SEMINARS**
  3 CREDITS EACH (ETCS)
  EC1: PYTHON & TOOLS FOR RESEARCH
  EC2: RESEARCH PROJECT
  EC3: SEMINARS

SEMESTER : SPRING

- **MACHINE LEARNING & SIGNAL PROCESSING**
  3 CREDITS EACH (ETCS)
  EC1: MODELS FOR MACHINE LEARNING
  EC2: SIGNAL PROCESSING

- **MATHEMATICS FOR DATA SCIENCE 2**
  3 CREDITS EACH (ETCS)
  EC1: PROBABILITY 1
  EC2: STATISTICS 1

- **OPTIMIZATION AND ALGORITHMS**
  3 CREDITS EACH (ETCS)
  EC1: NUMERICAL ANALYSIS AND OPTIMIZATION
  EC2: ALGORITHMS AND THEIR COMPLEXITY 2

- **APPLIED MACHINE LEARNING**
  3 CREDITS EACH (ETCS)
  EC1: DEEP LEARNING
  EC2: DATA CHALLENGE (KAGGLE)

- **DATA SCIENCE AND ITS ENVIRONMENT**
  3 CREDITS EACH (ETCS)
  EC1: ETHICS AND LAW
  EC2: RESEARCH PROJECT
  EC3: SEMINARS

- **STAGE DE 8 À 14 SEMAINES EN LABORATOIRE OU ENTREPRISE**
These courses are only offered to exchange students coming to Polytech Lille for a semester of study or an academic year within the partnerships or exchange programmes in engineering.

**POLYTECH**

MEASUREMENT SYSTEMS AND APPLIED BUSINESS

MECHANICAL, ELECTRICAL AND COMPUTER, SOFTWARE ENGINEERING AND STATISTICS, CIVIL, BIOLOGICAL SCIENCE AND FOOD ENGINEERING

MATERIALS SCIENCE

**SEMESTER : SPRING / AUTUMN**

CHEMISTRY

PHYSICAL AND ANALYTICAL

Level: MASTER 1
ADVANCED SPECTROSCOPY IN CHEMISTRY

SEMESTER: AUTUMN

- **NUCLEAR MAGNETIC RESONANCE**
  5 CREDITS (ECTS)

- **OPTICAL SPECTROSCOPY**
  5 CREDITS (ECTS)

- **QUANTUM CHEMISTRY AND CHEMICAL BOUND**
  5 CREDITS (ECTS)

- **ENGLISH**
  5 CREDITS (ECTS)

- **2 UNITS TO CHOOSE:**
  5 CREDITS EACH (ECTS)
  X-RAY DIFFRACTION
  DATA PROCESSING AND DATA ANALYSIS IN PHYSICAL-CHEMISTRY
  MASS SPECTROMETRY

SEMESTER: SPRING

- **PHYSICAL ORGANIC CHEMISTRY**
  5 CRÉDITS (ECTS)

- **METHODOLOGIES IN INORGANIC CHEMISTRY**
  5 CRÉDITS (ECTS)

- **IMAGING AND CHEMOMETRICS**
  5 CRÉDITS (ECTS)

- **ADVANCED CHEMICAL KINETICS AND CATALYSIS**
  5 CRÉDITS (ECTS)

- **2 UNITS TO CHOOSE:**
  5 CREDITS EACH (ECTS)
  EXPERIMENTAL METHODOLOGIES IN ENVIRONMENTAL SCIENCES
  SPECTROSCOPY FOR BIOLOGY
  APPLIED MOLECULAR SPECTROSCOPY
  SYNCHROTRON RADIATION AND ITS APPLICATIONS
CHEMISTRY
PHYSICAL AND ANALYTICAL

Level: MASTER 2
ADVANCED SPECTROSCOPY IN CHEMISTRY

SEMESTER : AUTUMN

- ADVANCED ANALYSIS METHODS OF ATMOSPHERIC COMPOUNDS
  5 CRÉDITS (ECTS)

- REACTIVITY IN HOMOGENEOUS AND HETEROGENEOUS PHASES
  5 CRÉDITS (ECTS)

- PHYSICS AND CHEMISTRY OF THE ATMOSPHERE
  5 CRÉDITS (ECTS)

- ADVANCED SPECTROSCOPIC TECHNIQUES FOR ENVIRONMENTAL ANALYSIS
  5 CRÉDITS (ECTS)

- OBSERVATION SYSTEMS FOR ATMOSPHERIC MONITORING
  5 CRÉDITS (ECTS)

- ADVANCED ENGLISH/FRENCH
  5 CRÉDITS (ECTS)

SEMESTER : SPRING

- RESEARCH INTERSHIP
  30 CRÉDITS (ECTS)
CHEMISTRY
MASTER BIOREFINERY
Level: MASTER 2

SEMESTER: AUTUMN

- PLANT BIOMASS PRODUCTION AND VALORISATION
  5 CRÉDITS (ETCS)

- BIO AND CHEMICAL PROCESSES
  5 CRÉDITS (ETCS)

- BIOMASS PRETREATMENT AND THERMAL TREATMENT
  5 CRÉDITS (ETCS)

- CHEMICALS AND FUELS FROM BIOMASS
  10 CRÉDITS (ETCS)

- ENGLISH
  5 CRÉDITS (ETCS)

SEMESTER: SPRING

- LAB RESEARCH
  25 CRÉDITS (ETCS)

- BIBLIOGRAPHIC REVIEW
  5 CRÉDITS (ETCS)
SEASON : AUTUMN

- CHARACTERISATION OF NANOSTRUCTURED AND DISORDER SOLIDS
  10 CRÉDITS (ETCS)

- INTERNSHIP AND TRANSFERABLE SKILLS
  10 CRÉDITS (ETCS)

- 2 OPTIONS:
  5 CRÉDITS EACH (ETCS)
  ORGANIC PHOTOCHEMISTRY
  MOLECULAR MODELING
  ADVANCED ANALYSIS METHODS OF ATMOSPHERIC SPECIES
  REACTIVITY IN HOMOGENEOUS AND HETEROGENEOUS PHASES

SEASON : SPRING

- MASTER THESIS
  30 CRÉDITS (ETCS)
SEMESTER : AUTUMN

• PRINCIPLES OF TERRITORIAL DEVELOPMENT IN EUROPE
  5 CRÉDITS (ECTS)

• INSTITUTIONS AND PUBLIC POLICIES IN EUROPE
  5 CRÉDITS (ECTS)

• THE EUROPEAN UNION, ACTOR AND PARTNER OF URBAN AND TERRITORIAL DEVELOPMENT
  5 CRÉDITS (ECTS)

• MAKING AND PLANNING THE CITY AND THE TERRITORY IN EUROPE
  5 CRÉDITS (ECTS)

• COOPERATION IN THE EUROPEAN FRAMEWORK, PRINCIPLES AND ISSUES
  5 CRÉDITS (ECTS)

• CONCEIVING AND CONDUCTING CROSSDORDER PLANNING PROJECTS
  5 CRÉDITS (ECTS)

SEMESTER : SPRING

• GROUP WORKSHOP
  10 CRÉDITS (ECTS)

• PROFESSIONAL INTERSHIP AND DISSERTATION
  20 CRÉDITS (ECTS)
SEMESTER: AUTUMN

- **MICROPALEONTOLOGY**
  5 CRÉDITS (ECTS)

- **BIOGEOCHRONOLOGY AND APPLIED CASE STUDIES**
  5 CRÉDITS (ECTS)

- **QUANTITATIVE PALEONTOLOGY**
  5 CRÉDITS (ECTS)

- **PALEOClimATOLOGY - GEoBIOLOGY**
  5 CRÉDITS (ECTS)
BIOLOGY
BACHELOR IN LIFE SCIENCES, CELL BIOLOGY AND PHYSIOLOGY SPECIALISATION
BILINGUAL TRACK (FRENCH + ENGLISH)
BACHELOR 1 (LICENCE 1)

SEMESTER : AUTUMN
• CHEMISTRY APPLIED TO LIFE SCIENCES
  5 CRÉDITS (ECTS)
• ANIMAL BIOLOGY 1
  5 CRÉDITS (ECTS)
• CELL BIOLOGY 1
  5 CRÉDITS (ECTS)
• ORGANIC CHEMISTRY 1
  5 CRÉDITS (ECTS)
• MATHEMATICS APPLIED TO LIFE SCIENCES
  4 CRÉDITS (ECTS)
• TRANSVERSAL UNIT : PERSONAL PROFESSIONAL PROJECT
  2 CRÉDITS (ECTS)

SEMESTER : SPRING
• PLANT BIOLOGY 1
  5 CRÉDITS (ECTS)
• BIOCHEMISTRY 1 : LIFE MOLECULES
  5 CRÉDITS (ECTS)
• GENETICS 1 : FORMAL AND MOLECULAR GENETICS
  5 CRÉDITS (ECTS)
• FROM ATOM TO THE COMPLEX MOLECULE
  5 CRÉDITS (ECTS)
• FROM THE CELL TO THE ORGANISM IN ITS ECOSYSTEM
  5 CRÉDITS (ECTS)
• MAIN ANIMAL PHYSIOLOGICAL FUNCTIONS
  5 CRÉDITS (ECTS)

*A C1 LEVEL IN FRENCH AND A B2 LEVEL IN ENGLISH ARE REQUESTED TO FOLLOW THE COURSES BELOW*
SEMESTER: AUTUMN

• CHEMISTRY APPLIED TO LIFE SCIENCES
  5 CRÉDITS (ECTS)

• ANIMAL BIOLOGY 1
  5 CRÉDITS (ECTS)

• CELL BIOLOGY 1
  5 CRÉDITS (ECTS)

• ORGANIC CHEMISTRY 1
  5 CRÉDITS (ECTS)

• MATHEMATICS APPLIED TO LIFE SCIENCES
  4 CRÉDITS (ECTS)

• PHYSICS APPLIED TO LIFE SCIENCES
  4 CRÉDITS (ECTS)

SEMESTER: SPRING

• PLANT BIOLOGY 1
  5 CRÉDITS (ECTS)

• BIOCHEMISTRY 1: LIFE MOLECULES
  5 CRÉDITS (ECTS)

• GENETICS 1: FORMAL AND MOLECULAR GENETICS
  5 CRÉDITS (ECTS)

• FROM ATOM TO THE COMPLEX MOLECULE
  5 CRÉDITS (ECTS)

• MAIN ANIMAL PHYSIOLOGICAL FUNCTIONS
  5 CRÉDITS (ECTS)

*A C1 LEVEL IN FRENCH AND A B2 LEVEL IN ENGLISH ARE REQUESTED TO FOLLOW THE COURSES BELOW*
**BIOLOGY**

BACHELOR IN LIFE SCIENCES, CELL BIOLOGY AND PHYSIOLOGY SPECIALISATION

**BILINGUAL TRACK (FRENCH + ENGLISH)**

**BACHELOR 2 (LICENCE 2)**

**SEMMESTER : AUTUMN**

- MICROBIOLOGY 1  
  5 CRÉDITS (ECTS)

- BIOSTATISTICS 1  
  5 CRÉDITS (ECTS)

- PLANT PHYSIOLOGY 1  
  5 CRÉDITS (ECTS)

- GENERAL ECOLOGY  
  5 CRÉDITS (ECTS)

- ANIMAL EMBRYOLOGY  
  5 CRÉDITS (ECTS)

- ANIMAL CELL PHYSIOLOGY  
  5 CRÉDITS (ECTS)

- BIOCHEMISTRY 2  
  5 CRÉDITS (ECTS)

**SEMMESTER : SPRING**

- CELL BIOLOGY 2  
  5 CRÉDITS (ECTS)

- CELL BIOCHEMISTRY  
  5 CRÉDITS (ECTS)

- MICROBIOLOGY 2  
  5 CRÉDITS (ECTS)

- GENETICS 2  
  5 CRÉDITS (ECTS)

- PHYSIOLOGY OF ANIMAL CELL COMMUNICATION  
  4 CRÉDITS (ECTS)

- PLANT RESOURCES VALORIZATION  
  4 CRÉDITS (ECTS)

- ORGANIC CHEMISTRY 2  
  5 CRÉDITS (ECTS)

*A C1 LEVEL IN FRENCH AND A B2 LEVEL IN ENGLISH ARE REQUESTED TO FOLLOW THE COURSES BELOW*
BIOLOGY

BACHELOR IN LIFE SCIENCES, POPULATION AND ORGANISMS BIOLOGY SPECIALISATION

BILINGUAL TRACK (FRENCH + ENGLISH)

Level: BACHELOR 2 (LICENCE 2)

SEMESTER: AUTUMN

• MICROBIOLOGY 1
  5 CRÉDITS (ECTS)

• BIOSTATISTICS 1
  5 CRÉDITS (ECTS)

• PLANT PHYSIOLOGY 1
  5 CRÉDITS (ECTS)

• GENERAL ECOLOGY
  5 CRÉDITS (ECTS)

• ANIMAL EMBRYOLOGY
  5 CRÉDITS (ECTS)

• ANIMAL CELL PHYSIOLOGY
  5 CRÉDITS (ECTS)

• BIOCHEMISTRY 2
  5 CRÉDITS (ECTS)

• ORGANIC CHEMISTRY 2
  5 CRÉDITS (ECTS)

SEMESTER: SPRING

• GENETICS OF POPULATION
  5 CRÉDITS (ECTS)

• ANIMAL BIOLOGY 2
  5 CRÉDITS (ECTS)

• PLANT BIOLOGY 2
  5 CRÉDITS (ECTS)

• MICROBIAL AND ECOSYSTEMIC ECOLOGY
  5 CRÉDITS (ECTS)

• ECOPHYSIOLOGY 1: NUTRITION FUNCTION
  5 CRÉDITS (ECTS)

*A C1 LEVEL IN FRENCH AND A B2 LEVEL IN ENGLISH ARE REQUESTED TO FOLLOW THE COURSES BELOW
BIOLOGY
BACHELOR IN LIFE SCIENCES, CELL BIOLOGY AND PHYSIOLOGY SPECIALISATION
BILINGUAL TRACK (FRENCH + ENGLISH)
Level: BACHELOR 3 (LICENCE 3)

SEMESTER : AUTUMN

• CELL DYNAMICS
  5 CRÉDITS (ECTS)

• BIOLOGY OF DEVELOPMENT
  5 CRÉDITS (ECTS)

• ANIMAL AND PLANT BIOTECHNOLOGIES
  5 CRÉDITS (ECTS)

• GENETICS 3
  5 CRÉDITS (ECTS)

• UNICELLULAR EUKARYOTIC GENETICS
  4 CRÉDITS (ECTS)

• GENETICS OF BACTERIA
  4 CRÉDITS (ECTS)

• HOMEOSTASIS AND REGULATION OF PHYSIOLOGICAL FUNCTIONS
  4 CRÉDITS (ECTS)

• INTEGRATIVE NEUROPHYSIOLOGY
  4 CRÉDITS (ECTS)

• PLANT PHYSIOLOGY: PERCEPTION AND COMMUNICATION FACE TO ENVIRONMENT
  4 CRÉDITS (ECTS)

SEMESTER : SPRING

• IMMUNOLOGY
  4 CRÉDITS (ECTS)

• EXPERIMENTAL STRATEGIES
  4 CRÉDITS (ECTS)

• INTERNSHIP IN A LAB, OR RESEARCH PROJECT
  5 CRÉDITS (ECTS)

• PLANT PHYSIOLOGY: DEVELOPMENT
  4 CRÉDITS (ECTS)

• PLANT GENOMICS
  4 CRÉDITS (ECTS)

• PLANT ECOPHYSIOLOGY: STRESS AND CLIMATIC CHANGES
  4 CRÉDITS (ECTS)

• SENSORIMOTOR PHYSIOLOGY
  4 CRÉDITS (ECTS)

• PHYSIOLOGY OF NUTRITION
  4 CRÉDITS (ECTS)

• ENDOCRINIAN COMMUNICATION
  4 CRÉDITS (ECTS)

• ANIMAL MODELS
  4 CRÉDITS (ECTS)

• MOLECULAR AND CELLULAR MECHANISMS OF ANIMAL DEVELOPMENT
  4 CRÉDITS (ECTS)

• ANIMAL CELL PLASTICITY AND ONTOGENESIS
  4 CRÉDITS (ECTS)

*A C1 LEVEL IN FRENCH AND A B2 LEVEL IN ENGLISH ARE REQUESTED TO FOLLOW THE COURSES BELOW*
## BIOLOGY

**BACHELOR IN LIFE SCIENCES, POPULATION AND ORGANISMS BIOLOGY SPECIALISATION**

**BILINGUAL TRACK (FRENCH + ENGLISH)**

**Level**: **BACHELOR 3 (LICENCE 3)**

### SEMESTER: AUTUMN

- **EVOLUTION GENETICS AND QUANTITATIVE GENETICS**
  4 CRÉDITS (ECTS)

- **ORIGIN AND EVOLUTION OF THE BIODIVERSITY**
  5 CRÉDITS (ECTS)

- **ECOTOXICOLOGY**
  5 CRÉDITS (ECTS)

- **ECOPHYSIOLOGY 2: RELATIONSHIP FUNCTION**
  4 CRÉDITS (ECTS)

- **MARINE FAUNISTIC AND FLORISTIC: INTERTIDAL DOMAIN**
  5 CRÉDITS (ECTS)

- **CONTINENTAL FAUNISTIC AND FLORISTIC**
  5 CRÉDITS (ECTS)

- **EPISTEMOLOGY AND SCIENCE HISTORY**
  5 CRÉDITS (ECTS)

### SEMESTER: SPRING

- **ECOLOGY AND BIODIVERSITY**
  5 CRÉDITS (ECTS)

- **BIOSTATISTICS 2**
  5 CRÉDITS (ECTS)

- **ECOLOGY OF THE POPULATIONS**
  5 CRÉDITS (ECTS)

- **MARINE FAUNISTIC AND FLORISTIC: SUBTIDAL DOMAIN**
  5 CRÉDITS (ECTS)

- **CONTINENTAL FAUNISTIC AND FLORISTIC**
  5 CRÉDITS (ECTS)

- **PLANT ECOPHYSIOLOGY: STRESS AND CLIMATIC CHANGES**
  5 CRÉDITS (ECTS)

* A C1 LEVEL IN FRENCH AND A B2 LEVEL IN ENGLISH ARE REQUESTED TO FOLLOW THE COURSES BELOW.
SEMESTER: AUTUMN

- **MARINE ECOSYSTEMS FONCTIONNING**
  4 CRÉDITS (ECTS)

*THIS COURSE TAKES PLACE IN WIMEREUX*