Paper Science, Print Media and Biomaterials

Courses

1ST *SPECIALIZATION* YEAR: CORE COURSES (Semester 3) - 391 h – 30 ECTS
PROCESSES: 118 h – 9 ECTS
Wet Air and Drying
Pulp Science and Recycled Fibers
Paper Science and Technology
Printing Science and Technology
Converting
ENGINEERING SCIENCES: 71 H – 6 ECTS
Numerical Analysis
Computing Project
Control Science
Statistical Process Control and Experimental Designs
MATERIALS SCIENCE: 101 h – 8 ECTS
Ink Properties
Color Science
Bioproducts
Pulp and Paper Physics 1: Refining
Pulp and Paper Physics 2: Pressing and Drying
TECHNOLOGICAL AND ECONOMIC BUSINESS ENVIRONMENT: 101 h – 7 ECTS
Financial Analysis
Quality and Management
Production Systems
Project Management
Career Development and Conferences
Placement Report
English
Sport
Total: 391 h – 30 ECTS

1ST *SPECIALIZATION* YEAR (Semester 4) - 444 h – 30 ECTS
THE ENGINEERING MINDSET AND PRACTICES (CORE MODULE): 119 h – 7 ECTS
English
Sport
2nd Foreign Language or Writing Skills
Business Intelligence for Technology
Sustainable Engineering
Introductory Economics
3 Day Field Trip
ELECTIVE MODULES
- **Paper**

Pulping: 102 h – 7 ECTS

Pulp Science 2
Applied Courses: from Wood to Pulp
Recycled Fibers 2

PAPER SCIENCE AND TECHNOLOGY: 137 h – 10 ECTS
Drying Methods, Multicylinder Dryers
Wet End Additives 2 (Retention Aids, Biocides)
Energy Systems and Papermaking
Papermaking Practicals
Paper Science and Technology 2: Refining, Specific Processes, Pressing
Paper and Board Physics: 86 h - 6 ECTS
Advanced Paper Physics
Wet End Additives 1
Flat and Corrugated Board
Paper and Board Materials: Color Reproduction
Paper and Board Materials: Paper or Image Analysis and Applications

- **Print Media**

PREPRESS: 61 h – 5 ECTS
Image Design and Processing, Proofing
Advanced Color Science
Color Management
Typography/Word Processing
PHYSICAL CHEMISTRY: 43 h – 4 ECTS
Special Ink
Surface Properties and Adhesion
Photophysics/Photochemistry
UV/IR Drying
PRINT MEDIA PROJECT: DESIGN AND MANUFACTURING OF A PRODUCT: 52 h - 4 ECTS
Prepress Software
Apogee Workflow System
Design and Manufacturing of a Product (Project)
PRINTING SCIENCE AND TECHNOLOGY: 58 h – 6 ECTS
Image Design and Processing, Proofing
Gravure
Digital Printing
Flexography
Screen Printing
Printing Plates
Comparative Study of Processes (Practicals)
Offset Printing Equipment
SPECIAL TOPICS IN PRINTING: 42 h – 4 ECTS
Imposition and Finishing
Project
Markup Languages and Structured Documents
Packaging: Biomaterials, Converting

- **Biomaterials and converting**

CONVERTING OPERATIONS: 74 H – 7 ECTS

Production of a Packaging Solution/Scoring
Unit Operations
Workflow for Packaging
Imposition and Finishing
Additional Drying Methods

PRINTING SCIENCE AND TECHNOLOGY: 75 h – 7 ECTS

Image Design and Processing, Proofing
Gravure
Digital Printing
Flexography
Screen Printing
Printing Plates
Comparative Study of Processes (Practicals)

PHYSICAL CHEMISTRY: 35 h – 4 ECTS

Thermal and Physical Properties of Materials
Surface Properties and Adhesion
Photophysics/Photochemistry
UV/IR Drying

MATERIALS SCIENCE: 73 H– 5 ECTS

Advanced Paper Physics
Wet End Additives 1
Flat and Corrugated Board
Biopolymers

2nd *SPECIALIZATION* YEAR (Semester 5) - 435 h – 30 ECTS

PROCESSES AND MATERIALS: 71 h – 5 ECTS

Coating
Signal Processing
Printability Tests, Printing Defects
Polymers Structures and Properties
Applied Solid Rheology

TECHNOLOGICAL AND ECONOMIC BUSINESS ENVIRONMENT: 121 h – 7 ECTS

Business Administration
Economics and Finance
Strategic Planning and Marketing
Employment Law and Social Responsibility
Business Simulation Game
Project Feasibility Assessment
Industrial Project Design Role-Play

CAREER DEVELOPMENT: 48 h – 5 ECTS

Career Paths (Elective: Production OR Methods and Quality OR Innovation and Development)
Conferences
Career Path Selection
2nd Year Placement Report

LANGUAGES AND SPORT: 90 h – 5 ECTS

English
Sport

According to Student's Level of English: Supplementary English Language Development OR 2nd Foreign Language (optional)

- **PAPER (Elective): 105 h – 8 ECTS**

Cellulose Fiber Bleaching
Water and Effluents
Mechanics of Complex Materials and Composites
Properties of Complex Materials and Composites
Calendering
Coating Processes
Cooking and Bleaching Simulation
Paper Manufacturing Project

- **PRINT MEDIA (ELECTIVE): 105 H – 8 ECTS**

Networks
Standards in the Print, Media, Publishing and Paper Industries
Auto Retouching for PDF
Digital Printing Business
Polymer Engineering
Project
Industrial Field Trip: BOBST Group

- **PACKAGING: BIOMATERIALS AND CONVERTING (ELECTIVE): 105 H – 8 ECTS**

Mechanics of Complex Materials and Composites
Properties of Complex Materials and Composites
Calendering
Coating Processes
Polymer Engineering
Converted Products
Industrial Field Trip: BOBST Group
Biocomposites

Elective Semester (Semester 5)

Students can choose to undertake an elective 5th semester in Pagora or in another branch of the Grenoble INP group. The elective semesters which open to Pagora students are:

- Industrial Processes and Environmental Management (PIME, Grenoble INP - Pagora)
- Technology and Innovation Management, Business and Innovation (MANINTEC, Grenoble INP - Génie industriel)
- Computer Science (Grenoble INP - Ensimag)
- Industrial Management and Logistics (Grenoble INP - Génie industriel)

PIME Semester

Pagora organizes the Industrial Processes and Environmental Management elective semester program (PIME). This is a course involving several of the Grenoble INP member schools (currently Pagora, Ense^3 and Phelma) and was established in 2002. The PIME semester trains engineers in procedures for the treatment of effluents, environmental management and the functioning of natural environments. This course is wide ranging and provides students with a global appreciation of the interaction between industry and the environment. The part the environment plays in the industrial milieu is a complex issue which includes water, gas and solid waste

treatment, waste management (transportation, recycling, disposal), impact on the surroundings, community issues, regulations and technological innovation in the reduction of the consumption of water, energy and raw materials. The aim of the PIME course is not to train process or management specialists but engineers capable of dealing with environmental problems in their totality by drawing on the resources of specialist engineers in specific domains (such as industrial site engineers or consultants). This is particularly apparent in the course's interaction with the international scientific and industrial communities and choice between 2 modules (operational safety/energy-urban habitat) closely connected to those in PIME.
The PIME semester functions in response to the high level of demand from industry for engineers with expertise in environmental issues as well as their main field. The considerable level of expertise at Pagora and the increasing importance of sustainable development, resource management and waste treatment in the paper industries led to Pagora's considerable investment in this course. This elective semester also enables Pagora to reinforce its understanding of environmental issues in its courses.