



Université   
de Valenciennes  
et du Hainaut-Cambrésis

**THE CAMPUS FOR SUSTAINABLE  
TRANSPORT AND MOBILITY**

**TRAINING - INNOVATION - RESEARCH**



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# A REGIONAL LEADER IN THE AUTOMOTIVE, RAIL AND MOBILITY SECTORS

*The University of Valenciennes and Hainaut-Cambrésis is at the heart of one of the most dynamic regions in the world for the automotive, rail and mobility industries. A sector which is experiencing a worldwide revolution as it enters into the era of multimodality, efficient, environmentally friendly vehicles, and innovative services for mobility.*

> It is therefore natural that the University of Valenciennes has become a great innovative campus with international visibility in the area of transport. Its ambition is to provide high-level training and innovation, in synergy with the manufacturers, the transport operators, the centres of excellence and in line with the sector's future innovation needs.

1 The automotive sector accounts for the region's more than 30,000 jobs.

2 4 The Nord Pas de Calais is the number one region for the rail sector providing 10,000 jobs.

3 Offering training and its centre of excellence in research, the University of Valenciennes is the campus innovating sustainable transport and mobility.

5 The Nord Pas de Calais ranks as the third region in France for logistics.

> Indeed, Nord Pas de Calais is the first region in France for the rail and the automotive sectors and the third for logistics. With 300 businesses and 60,000 professionals, it hosts both large international groups and a tightly-woven and structured fabric of SMEs, subcontractors and specialised services companies which are for the most part, located in the Valenciennes region.

> Valenciennes is also the headquarters of the European Railway Agency, the Railway Certification Agency - Certifer, the Pôle Automobile [Automotive Hub], the Centre for World Class Competitiveness - i Trans, the Association of Rail Industries (l'Association des Industries Ferroviaires - AIF), the Institute of Technological Research - Railenium, a Rail Testing Centre, and Transalley, the technological hub dedicated to innovative and sustainable mobilities, located in the extension of the university campus of Mont Houy.

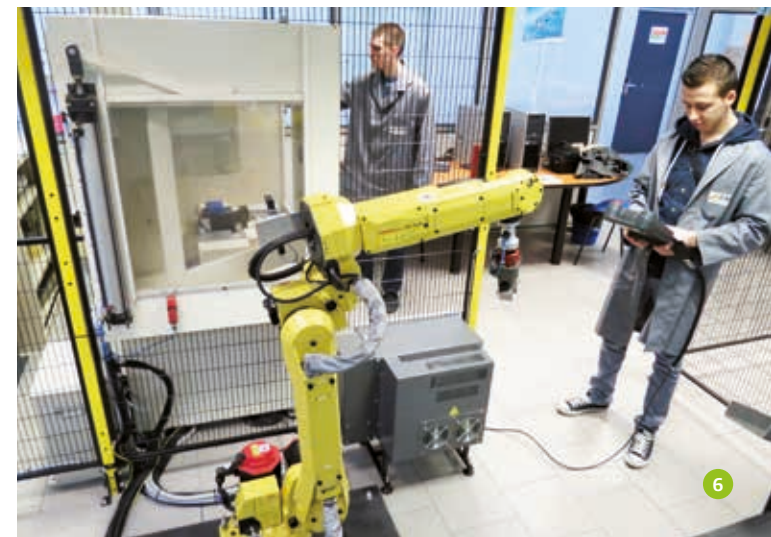
**"TOMORROW'S GREENER,  
SAFER, MORE RELIABLE, MORE  
INTERCONNECTED AND MORE  
ACCESSIBLE TRANSPORT IS  
BEING INVENTED AT THE  
UNIVERSITY OF VALENCIENNES."**

# A UNIVERSITY RECOGNISED FOR ITS PROFESSIONAL QUALITY TRAINING AND FOR ITS RESEARCH IN TRANSPORT AND MOBILITY

- 1 4 *The University's students benefit from optimal conditions for their studies: libraries, university restaurants, sporting equipment, cultural and related activities, green campuses, etc.*
- 2 3 *The University is recognised for its research works in transport and mobility; it is working, for example, on the aero dynamism of trains and even on transport accessibility for people with reduced mobility.*
- 5 *The SHERPA driving simulator of the LAMIH UMR CNRS 8201 is used for research projects on the study of new driving aid systems and their impact on the behaviour of drivers and road safety.*
- 6 *Students at the Valenciennes, Cambrai and Maubeuge campuses also have access to educational equipment, technological platforms and the University's research laboratories.*

- > It enrolls more than 10,600 students in its campuses on a human scale at Valenciennes, Cambrai and Maubeuge and offers them the opportunity to train for a career through 150 work study training courses from the BAC + 2 to the BAC + 8 in three areas: Sciences, Technology, Health - Law, Economics, Management - Arts, Humanities, Languages, Human and Social Sciences.
- > Students can enrol in initial training or continuing education programmes and it is among the top universities in France in terms of the number of students enrolled in the apprenticeship curriculum. In addition to the quality of its training to content supplied particularly by seven (7) research laboratories, the University is recognised as among the best in France for its employability rates! Oriented toward businesses and the socio-economic world, the development of its territories is an ongoing concern.
- > Moreover, over the last twenty or so years, it has been recognised internationally for the quality of its research in transport and mobility. With the creation of a new sector dedicated to these themes, the training component is aligned on this level of excellence.





# A UNIVERSITY THAT IS THE ENGINE OF AN ECOSYSTEM DEDICATED TO SUSTAINABLE TRANSPORT AND MOBILITY



## > WITH THE TRANSALLEY TECH HUB

The international centre of excellence on mobilities develops innovative and R&D activities by creating young businesses, lending support to SMEs and starting new businesses. A true meeting place of researchers, entrepreneurs and students, the 34 hectare activities park spread over the Valenciennes agglomeration offers all the services and spaces for businesses and sectoral actors (incubator, business hotel, technical centre, showroom, etc.). The immediate connection with the University allows businesses to take advantage of a pool of highly qualified skills and foster the emergence of common projects with the research laboratories.

## > WITH THE INTERNATIONAL CAMPUS ON SAFETY AND INTERMODALITY IN TRANSPORTATION (CISIT = CAMPUS INTERNATIONAL SUR LA SÉCURITÉ ET L'INTERMODALITÉ DANS LES TRANSPORTS)

The CISIT aims to develop sustainable mobility of people and goods by making transport and its infrastructure more reliable, smarter and more environmentally friendly by bringing together the best actors in research in the Nord Pas de Calais region.

**"THE TECH HUB HOUSES ALL THE  
KEY ACTORS IN THE TRANSPORT  
SECTOR AT THE SAME SITE, THEREBY  
CREATING A UNIQUE ECOSYSTEM WITH  
THE UNIVERSITY TO SUPPORT THE  
DEVELOPMENT OF THE BUSINESSES IN  
THIS SECTOR THROUGH INNOVATION  
AND R&D."**

**"THE CISIT IS A SCIENTIFIC DRIVING  
FORCE REPRESENTING AN IRRIGATION  
SOURCE FOR THE ENTIRE REGIONAL  
ECOSYSTEM WHOSE PRINCIPAL ACTORS  
ARE ALREADY AT THE TECH HUB."**



➤ **WITH ITS LABEL "CAMPUS INNOVATING SUSTAINABLE TRANSPORT"**

In 2008, the Ministry for Higher Education and Research awarded four (4) "Innovative Campus" labels one of which went to the University of Valenciennes for its project on sustainable transport especially for the creation of the Institute of Sustainable Transport, a true place promoting the University's know-how (training, research and innovation).



➤ **WITH THE RAILENIUM INSTITUTE OF TECHNOLOGICAL RESEARCH (RAILENIUM IRT)**

The University invests its research strengths in the Railenium IRT which gathers together the best French and European public and manufacturing researchers to improve rail transport and optimise infrastructure and its maintenance and management. These resources cover test benches and digital simulation platforms.



**"THE UNIVERSITY RECEIVED SUPPORT FROM RAILENIUM TO OBTAIN THE "MASTER ENGINEERING CURRICULUM" LABEL OF EXCELLENCE."**

➤ **WITH VALUTEC, ITS AFFILIATE DEDICATED TO THE TRANSFER**

VALUTEC, a specialist in the automotive and rail sectors, assists businesses with their approach in research, innovation and development. The testing resources are located in the various workshops of its Technology Centre in Ground Transportation. The business collaborates closely with the University's laboratories and departments.



# DELIVERING FULL AND ORIGINAL TRAINING WHICH PREPARES STUDENTS FOR TOMORROW'S CAREERS

> To enhance anchoring on its region and to prepare the specialists and train them for tomorrow's careers, the University offers curricula that have been specifically developed for the automotive, rail and mobility sectors for the 2015 academic year. The sector involves all of its institutes and faculties for all levels of training from the BAC + 2 to the BAC + 6 to train experts in science and technology, international law, design, economics and transport management using teaching methods ranging from conventional classroom training to e-learning.

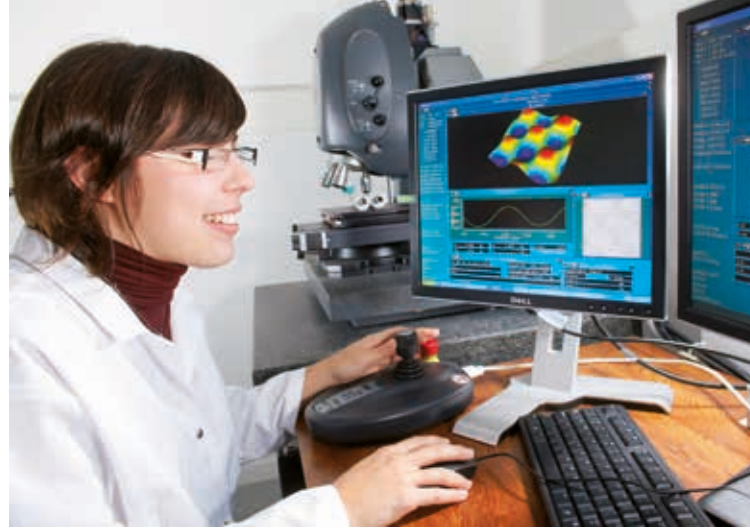
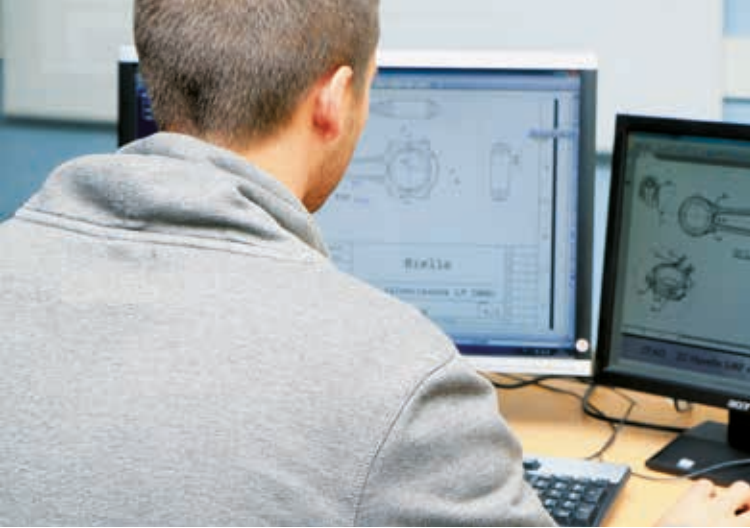


**"TRAIN EXPERT TECHNICIANS AND SENIOR EXECUTIVES TO BE ABLE TO MEET FUTURE CHALLENGES IN THE AREA OF AUTOMOTIVE AND SYSTEM DESIGN OF RELIABLE, SAFE, COMMUNICATIVE, SMART AND ENVIRONMENTALLY FRIENDLY TRANSPORT."**

## > THE NEW OFFER DEDICATED TO TRANSPORT

- 5 University Diplomas in Technology
- 2 Professional Undergraduate Degrees
- 1 Master in Engineering Curriculum
- 4 Masters, including 1 International and one 1 Distance Learning
- 5 Diplomas in Engineering
- 1 Master's





### ➤ LABELLED TRAINING OF EXCELLENCE

The University obtained the agreement of the Figure network evaluation committee to open a Master in Engineering Curriculum (CMI = Cursus Master en Ingénierie) training of excellence at the Institute of Science and Technology (ISTV). The CMI in Transportation & Mobility is an enhanced "Master BSc" training curriculum, supported by two CNRS research laboratories (LAMIH and IEMN) which prepares students for the engineering profession. This labelling provides for the training of high potential students for business sectors related to research, development and innovation. Furthermore, several types of training benefit from the i Trans label, a competitiveness cluster for innovative transportation. This is the case of the types of training of the ENSIAME school of engineers or the ISTV specialised masters in mechanical, automatics and electronics engineering.

### ➤ DISTANCE LEARNING MODULES

Authorised by the UTOP national rail project, the University is being funded to develop distance learning teaching which should be of interest to employees and "co op" students. There are quite a number of them in the region, sometimes located near the University campus, at corporations such as Alstom, Bombardier, Toyota, etc.

ISTV offers collaboration with the CNAM of Paris, a distance learning programme: a specialised master 2 in rail transport.

**"FRANCE WILL LACK EXPERTS  
IN THE RAIL SECTOR OVER THE  
NEXT TEN (10) YEARS."**

**"55% OF THE GRADUATES FROM  
THE UNIVERSITY'S SCHOOL OF  
ENGINEERS WORK IN THE TRANSPORT  
SECTOR, HALF OF WHOM WORK  
IN THE AUTOMOTIVE SECTOR,  
A THIRD IN AVIATION AND THE  
REMAINDER IN RAIL."**

# PREPARING FOR A BAC+2 UNIVERSITY DIPLOMA IN TECHNOLOGY

> **ELECTRICAL ENGINEERING AND COMPUTER SCIENCE**  
Automation and systems specialising in the design, production, implementation and maintenance of automated systems.

• **Partners:** Alstom Transport, Bombardier Transport, ERDF-GRDF, Française Mécanique, LME, MCA Maubeuge, Renault SAS, Sevelnord, Siemens Transportation, SNCF, Vallourec, Wagon Automotive

> **INDUSTRIAL ENGINEERING AND MAINTENANCE**  
Versatile technical training for industrial purposes: maintaining equipment, continuously improving industrial systems, management (task scheduling, cost evaluation), organisation (information, advice and team coordination).

• **Partners:** Renault Douai, MCA, PSA, SevelNord, Alstom, Bombardier, Toyota

> **MECHANICAL ENGINEERING AND PRODUCTION**  
Assist in the competitiveness of businesses in all of the stages of a product's life by optimising the technical, scientific, economic and human choices and integrating the quality, maintenance and safety requirements.

• **Partners:** Bombardier, Alstom, Dassault, Renault, Peugeot, Toyota, Française de Mécanique, Vallourec, Sevelnord, SMAN, SNFA, LECQ, LERC, etc.

> **PHYSICAL MEASURES**  
Exploitation measures in the fields of physics, chemistry, materials, electronics and information technology. Competencies focused on instrumentation (testing, trials, research and development), manufacturing control and metrology.

• **Partners:** AGC, Arcelor Mittal, Bombardier, Enersys, Europ Usinag, Jeumont Electric, JSPM Areva, Lear Corporation, MCA, RAR, Vallourec, Vesuvius, West Pharmaceutical.

> **QUALITY, INDUSTRIAL LOGISTICS AND ORGANISATION**  
Organisation of production resources, workflow management, control and quality assurance.

• **Partners:** Renault, PSA, Sevelnord, Toyota, Alstom transport, Bombardier, Columbia, Florette, Tanys, Faurécia, Ygnis, L'Oréal, Générale des Eaux, Centre hospitalier de Denain, Hôpital Oscar Lambret, Collectivités Territoriales.

• **The + of DUTs (Diplôme Universitaire de Technologie = University Diploma in Technology):**

- 10 week co ops
- A mix of IUT/business (work-study youth training scheme or apprenticeship contract)
- Supervised project that concludes with a thesis and its oral defence
- International opportunities: internships in Europe, North America and Asia



# PREPARING FOR A BAC+3 PROFESSIONAL UNDERGRADUATE DEGREES

## > CAREERS IN ELECTRONICS: COMMUNICATION, EMBEDDED SYSTEMS

Computer and Communication Courses in Land Transport

Electronics and Telecommunications Courses in Land Transport

Train engineers' assistants in the area of embedded systems, implementation of new technologies, software development, maintenance and implementation of control and diagnostic processes.

- **Partners:** Actia - Agrotrox - Alstom - Anf Bombardier - Brime Ingénierie - Cnrs - Delphi - Electricfil Automotive - Exxotest - Jeumont Industrie - La Poste - Oxford Automotive - Mca - Nsi Services - Railtech International - Renault SA - Rexel - Svee - Toyota - UMV, etc.
- **The +:** supervised projects, apprenticeship contract, case studies and 16 week co ops.

## > MANAGEMENT AND OPERATION OF AUTOMOTIVE AND RAILWAY PRODUCTION UNITS

Manage maintenance and production teams, establish "Advanced Organisations" in maintenance in production islands, develop competencies in the areas of quality assurance, environmental control and safety, and integrate into ongoing improvement projects (lean manufacturing, six sigma, etc.).

- **Partners:** Bombardier, Alstom, Renault, Peugeot, Toyota, Sevelnord, etc.
- **The +:** supervised projects, case studies and 16 week co ops and work-study youth training scheme.

# PREPARING FOR A BAC+5 MASTER

## > TRANSPORT, MOBILITY AND NETWORKS CURRICULUM

### Careers specialising in Automatics, Mechanical and Electronics Engineering

It is an enhanced 5-year "BSc-Master's" programme, certified by the national Figure network and backed by LAMIH UMR CNRS 8201 and the IEMN UMR CNRS 8520. It provides training in three core professions in the area of transport and mobility: automatics and computer science, mechanical engineering and digital simulation, embedded electronics and digital communication.

#### • **AutHumMobile Course I**

The AutHumMobile Course I (Automated, Human and Mobility Engineering) - offers theoretical and practical training in advanced control, robotics, computer science and human-machine system for applications related to transport, such as automobiles, and production systems.

#### • **IM-C<sup>2</sup>MAO Course**

The IM-C<sup>2</sup>MAO course (Computer Aided Design and Mechanical Calculations) provides training in engineering functions, specialists in mechanical design and digital simulation of processes and mechanical behaviour (formatting, comfort, crash and safety, dynamic flows, optimisation, etc.)

#### • **ISECOM Course**

The ISECOM course is designed to give you high level skills in the area of embedded systems and digital communications (mobile telephony, wired and wireless networks, indoor and outdoor high flow communication, satellite link, etc.) with a strong orientation toward transport applications.

#### • **The + of the curriculum:**

- Scenario-based activities (practical works, research-development-innovation projects, multidisciplinary integration projects) carried out on CNRS partnered laboratory technology platforms: driving simulator, air traffic simulator, rail simulator, engine benches, hybrid vehicles, actual equipped vehicles (SYFRA), flexible cell (AIP), wind tunnel, thermomechanical benches, crash materials and structures, comfort and vibration.
- Development of transversal skills and strengthening English.
- 3 internships in manufacturing or in a research laboratory (10 months spread over the curriculum).
- Training supported by the Railenium IRT.

#### • **Partners:**

- **Rail:** SNCF, Alstom, Bombardier, Afr titagarh, MG Valdunes, SNCF Network, Certifer, Ansaldo.
- **Automotive:** Renault, Psa, Visteon, Valeo, Faurecia, Autolive, Toyota, Continental
- **Aviation:** SNECMA, EADS, Airbus Helicopters, Skf Aeroengine
- **Engineering, Advice:** Ajilon, Akka, Alten, Assystem, Cimes, ECM, NEU
- **Steel industry:** Arcelor-Mittal, Tata Steel, Vallourec
- **Glass blowing:** Arc International, Saint Gobain



## > RAIL ENGINEERING AND GUIDED SYSTEMS: DISTANCE LEARNING DURING THE 2ND YEAR OF THE MASTER'S

This distance learning is the first one in the rail and guided transport sector. It provides the skills to develop interactive and communicative digital systems, design a system using different approaches, test theoretical models and create others, use or develop NICTs (New Information and Communication Technologies) and analyse how a system works.

- **Partners:** IFSTTAR, Alstom, Bombardier.

## > LOCAL DEVELOPMENT AND TRANSPORT ECONOMY

Train professionals for the transport and land use planning sector: infrastructure managers, transport operators, transport authorities, manufacturing, etc.

- **Partners:** I-Trans Competitiveness Cluster.
- **The +:** internships, 30% of the courses in English, opportunity to enrol in a co-operative programme or in a work-study youth training scheme.

## > TRANSPORT LAW

Train high level lawyers in international business law in the field of sustainable transport

- **Partners:** Alstom, European Railway Agency, Euro Tunnel, Sevelnord, law firms.
- **The +:** business English courses which are added to the English, German, Spanish and Italian language courses, co operative programme, professorship Jean Monnet of the European Commission



## > INTERNATIONAL MASTER'S IN TRANSPORT AND ENERGY

Expertise in the areas of materials, energy, comfort, safety and reliability in the automotive, rail and aviation transport sectors.

- **Partners:** Airbus, Alstom, Audi, BMW, Bombardier, Bosch, Daimler, PSA, Renault, Toyota, etc.
- **The +:** all the courses are delivered in English, scenarios using the ENSIAM technological platforms and the University's laboratories such as engine testing benches, "co ops" and supervised projects.

# PREPARING FOR A BAC + 5 ENGINEERING



## > GENERAL ENGINEERING

Training accessible via the Common Polytechnic Competitions (engineering school entrance examination) or by application for holders of a university diploma in technology (DUT = Diplôme Universitaire de Technologie) or a Bachelor 3 or Master's 1.

**3 specialties:**

- **Mechanical Engineering-Power Engineering**
- **Mechatronics**
- **Informatics and Systems Management**
- **Partners:** Airbus, Alstom, Audi, BMW, Bombardier, Bosch, Daimler, PSA, Renault, Toyota, etc.
- **The +:** training certified by the competitiveness cluster with international ambitions: i-Trans, international opportunities and manufacturing orientation

## > "CO OP" ENGINEERING PROGRAM

- by way of Apprenticeship: the apprentice is the "student-employee"
- by way of Continuing Education for employees and job seekers.

For these 2 paths, candidates must have a BAC+2 (or a level for the FC) and recruitment takes place by application and interview.

**2 specialties:**

- **Industrial Engineering**
- **Electrical Engineering and Computer Science**
- **The +:** From the first year in engineering, students do a "co op" to put into practice what they learn at school and compare their theoretical knowledge with on site realities. They are immersed directly into the working environment.

# PREPARING FOR A BAC + 6

## > MASTERS IN RAIL AND URBAN TRANSPORT SYSTEMS

Training experts in rail and urban transport with teaching consisting of compulsory and optional modules for 10 weeks, at the rate of one week per month. These courses are followed by a 4 month "co op" assignment leading to the defence of a professional thesis.

- **Partners:** SNCF, RFF, RATP, Alstom, Bombardier, Siemens, Ansaldo STS, EPSF, etc.
- **The +:** scenarios with the Petite Forêt Railway Testing Centre and several visits to France and abroad.

## THE CAMPUS FOR SUSTAINABLE TRANSPORT AND MOBILITY

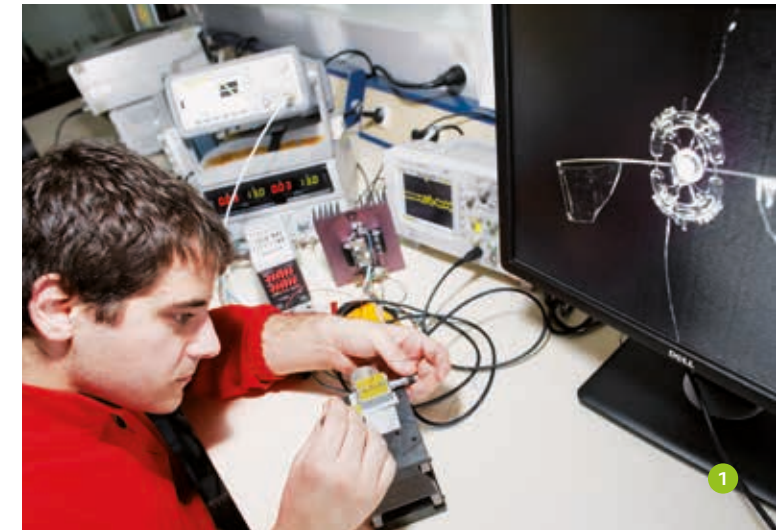
- 1 The IEMN DOAE Opto-Acousto-Electronic laboratory is working on new nano-UAVs for monitoring and inspection.
- 2 The Laboratory of Ceramic Materials and Related Processes is particularly interested in the development of bone substitutes based on calcium phosphates for controlled macro and microporosity and bioglasses, new piezoelectric materials with or without lead, bulk materials and coatings resistant to wear and corrosion.
- 3 Nearly 200 PhD students are supervised by the University's research teams.
- 4 The creative mine in Arenberg: a true centre of excellence in images and digital media where the researchers of the DeVisu laboratory will be installed in autumn 2015.

# A MULTIDISCIPLINARY AND COMPLEMENTARY APPROACH WITH THE UNIVERSITY'S LABORATORIES

➤ The research policy of the University of Valenciennes strengthens the link upstream with training, and downstream in development activities with its manufacturing partners.

It takes advantage of its human scale and its multidisciplinary approach to develop transversal projects collaborating closely with the socio economic environments around 4 clusters:

- Sustainable transport and mobility
- Images and digital creations
- Health and disability engineering
- Safety and risk control



# THE COMPETENCIES OF ITS LABORATORIES

## > AUTOMATICS, MECHANICAL ENGINEERING, COMPUTER SCIENCE, HUMANITIES AND LIFE SCIENCES (LAMIH UMR CNRS 8201)

104 research professors

Competencies:

- Department of Automatics: robustness, complexity and cooperating intelligent systems
- Department of Mechanical Engineering: materials, fluids and structures in extreme conditions
- Department of Computer Science:
- Department of Human and Life Sciences: Psychology and cognitive ergonomics, study of movements

## > ULTRASOUNDS, TELECOMMUNICATIONS, ACOUSTICS MICRO-SYSTEMS, ELECTRONICS (IEMN DOAE UMR CNRS 8520)

41 research professors

Competencies:

- Materials and nanostructure
- Micro technology and microsystem
- Micro and optoelectronics
- Circuits and telecommunications systems
- Acoustics



## > DESIGN, VISUAL, URBAN (DEVISU)

22 research professors

Competencies:

- Engineering of the audio visual document and digital media
- Communication applied to architecture and urbanism
- Informational and communicational quality to promote creativity and innovation in organisations and companies

## > CERAMIC MATERIALS AND RELATED PROCESSES (LMCPA)

20 research professors

Competencies:

- Biomaterials: bioceramics and bioglasses developed for a variety of clinical applications, such as bone substitution.
- Thermomechanical and piezoelectric ceramics used in massive form or coating to improve material properties

## > CULTURE, ARTS, LITERATURE, HISTORY, IMAGINARIES, SOCIETIES, REGIONS, ENVIRONMENT (CALHISTE)

50 research professors

Competencies:

- Arts and technical sciences around the digital sector
- Crossover study of the text, archive and image

## > MATHEMATICS AND THEIR APPLICATIONS (LAMAV)

40 research professors

Competencies:

- Algebra and theory of numbers
- Partial differential equations
- Computer aided geometrical design
- Geometry and overall analysis
- Probabilities and Statistics
- Algebraic Topology

## > INSTITUTE OF DEVELOPMENT AND PLANNING (IDP)

50 research professors

Competencies:

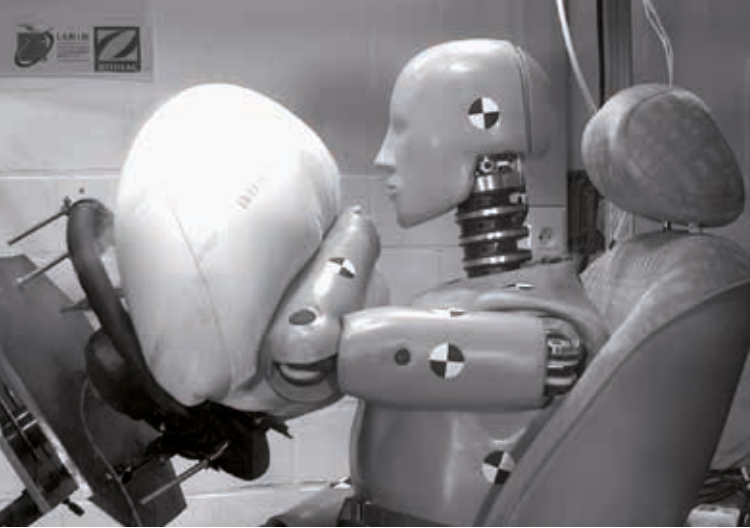
- Innovation, regions and social inclusion
- Mobility and sustainable development
- Risk, information, organisation
- Contract law and banking and real estate activities
- Theory, models, systems

# RESEARCH IN TRANSPORT AND MOBILITY

- The University is recognised for its research, as the regional pilot, and therefore as a national and international research leader in the field of sustainable transport and mobility around three major societal challenges:
- Energy and environment
  - Mobility and Logistics
  - Safety, security and reliability







# ILLUSTRATIONS OF THE KNOW HOW OF ITS LABORATORIES



## ➤ **STRUCTURES THAT ABSORB BETTER IMPACT ENERGY**

The research teams work at the same time on the structure of the vehicles so that it absorbs the maximum of impact energy while being light to reduce fuel consumption. It is a new challenge to find materials which lighten the vehicle without degrading the safety level achieved in recent years. Research teams have on site significant and original testing resources to characterise the properties of the materials and to test the structures.

## ➤ **PREDICTING THE RISK OF INJURY IN CASE OF CRASH**

Researchers are interested in predicting the risk of injuries to vehicle occupants and vulnerable road users, pedestrians and two wheels. They are seeking to create a virtual human model. Several countries assist, each focusing on a body part. The bone structures of the skull, thorax and upper limbs are being studied at Valenciennes.

## ➤ **ACCESSIBLE TRANSPORT FOR DISABLED PERSONS OR THOSE WITH REDUCED MOBILITY**

How do you get into a car when you have back problems? How do you steer when you have shoulder or elbow problems? Researchers are working with Renault on the ergonomics of access to the driving position for people who have difficulty bending and with JTEKT, a Japanese world leader, on enhanced assistance on the steering wheel for the disabled.

## ➤ **CLEANER TRANSPORT**

The preservation of the environment is another focus of transport research. A team is working with a manufacturing partner on cleaner lubricants for embossing car plates. This product could be used by automobile manufacturers within a few years. Researchers are also optimising injection control laws for a hybrid engine that uses less fuel and emits fewer pollutants.

# HIGH LEVEL TECHNOLOGICAL RESOURCES



- The offer of training and the research activity dedicated to transport and mobility have another sizable asset: the University's technological resources. This comes with significant equipment in the field of transport, particularly as part of the Technical Centre (C3T) intended for businesses and managed by VALUTEC, an affiliate of the University which fosters innovation, meets manufacturing needs and assists with forming businesses.
- Training in the transport and mobility sector is backed by the research laboratories at UVHC two of which are affiliated with the CNRS: the LAMIH UMR CNRS 8201 and the IEMN DOAE UMR CNRS 8520. Thus, the students have the opportunity to use some of their equipment to complete their projects and practical work.

Also, some training departments have technological and teaching platforms. Thus, the IUT makes available design and prototyping tools, robots, handling facilities equipped with 3D printers and plasma cutting tools. A humanoid robot "Nao" is experienced to assist people with reduced mobility.

The ISTV also offers its mechanical engineering students a 3D scanner retro-engineering platform and a correlation platform for testing and calculating crashes, impact and safety. The ENSIAME school of engineers has an autonomous vehicle and a hybrid vehicle where the students develop new functionalities in energetics and electronics.

**"THE UNIVERSITY IS AT THE FOREFRONT OF TRANSPORT RESEARCH AND AS SUCH HAS HIGH QUALITY TECHNOLOGICAL PLATFORMS THAT CAN ALSO SERVE AS TEACHING ONES."**

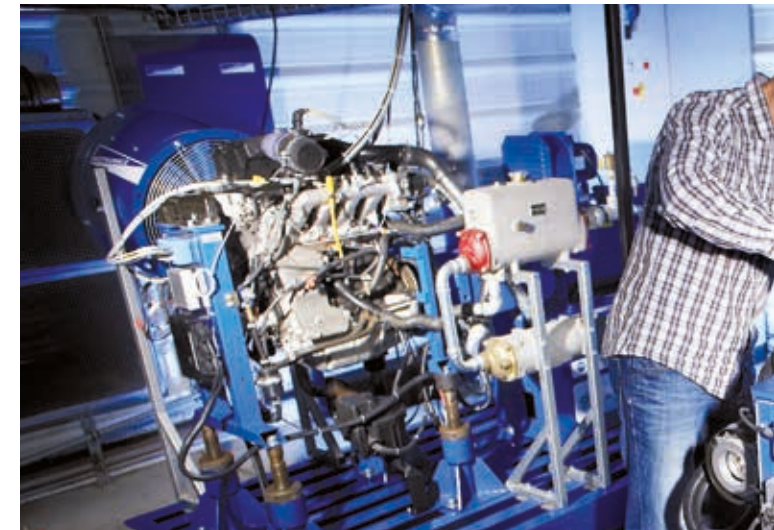
**THE UNIVERSITY HAS MANUFACTURING MATERIALS AND CAN MEET LOCAL, NATIONAL AND EVEN INTERNATIONAL DEMANDS.**



# PLATFORMS AND EQUIPMENT

- 3D Gestural Analysis
- CIM Workshop, robotics and remote maintenance (AIP)
- Acoustics technologies workshop
- Aerodynamics, pedestrian impacts, interference noise, braking, manoeuvring benches
- Hopkinson Bars
- Biomechanics of shock
- 3D measurements arm
- CAO
- Scientific calculator
- Catapult aggravated test bench
- Flexible cell (AIP)
- Acoustics chamber
- Driving on rail and traffic management
- Equipment crashes and structures
- Climate chamber
- Electrodynamic exciter
- Flotilla of mobile robots
- Glass - tool interface
- Support platform for power steering for use in PMRs
- Plateforme of 5 available cylinders
- PSCHITT-PMR platform, multimodal simulation for PMRs
- Platform for the design of sensors and ultrasound components
- Well drops
- Daylight room
- Train driving simulator
- Car driving simulator
- Street pedestrian simulator
- Air traffic simulator
- Wind tunnel
- RF-ID interactive table
- Hot tribology
- Hybrid vehicles
- SYFRA Vehicule: SYstem For smart Road Application (V2V, V2I, Anticollision Radars, Localisation, Wireless Control)...
- Quick cylinder, high speed braking
- Quick videos
- ...

- 1 Motorised and driven wheelchair to provide mobility assistance to persons with disabilities.
- 2 The wind tunnel is used for the development of basic experimental research and for aerodynamics testing and is called the "Centre of Resources and Scientific and Technological Expertise".
- 3 The "Gleeble 3500" platform conducts traction and compression testing on metal alloys, from room temperature up to near melting temperatures.
- 4 The Hopkinson bars used in the framework of the characterization of the behaviour at very high strain rates.
- 5 The well drop is a device that characterises shock materials. It is based on the notion of kinetic energy storage with a free falling mass which impacts the structure to be characterised. The mechanical behaviour of the impacted structure is recorded then analysed to extract the properties of constitutive material from it.
- 6 The thermal engine testing bench studies the behaviour of automobile engines.
- 7 The interactive table interacts to regulate, for example, road traffic.
- 8 Supervisory position of SHERPA driving simulator used for research and manufacturing testing projects regarding driving behaviours and their impact on road safety.





# A SYNERGY WITH THE SOCIO ECONOMIC WORLD

> The University can count on the manufacturers in the transport sector with whom a close relationship is built over the years.

Thus, the official bodies of the institution are comprised of numerous representatives from the manufacturing sector, particularly from the automotive and rail sectors: Mercedes, Alstom, PSA, Toyota, Bombardier et Vallourec, etc.

Strong relationships also exist for developing training. The institution has, for example, created the Bachelor's in the "management and conduct of automotive and rail production units" in consultation with Alstom, Bombardier, logistics sub contractors and transporters by comparing the referential of competencies of businesses in the transport sector and the University's training proposal and by projecting into the future.

Furthermore, several partnerships connect our researchers to French and foreign businesses in the transport sector.

> **APPRENTICE-RESEARCHERS  
FOR INNOVATION IN SMES**

This is an unprecedented and pioneering action that the University is establishing with the support of the Union of Metallurgy Industries and Trades (UIMM = Union des Industries et des Métiers de la Métallurgie). The idea is simple but had never before been exploited: to facilitate the access of SMEs to research, the University makes apprentice-researchers available to business leaders whose concerns are similar to the research topics of its laboratories.

- The apprentice, a young researcher "accessible" for SMEs
- The laboratory becomes the R&D heart of the business



> **CREATION OF 2 START UPS WITH  
THE SUPPORT OF THE LAMIH  
UMR CNRS 8201 LABORATORY**

- **Autonomad Mobility**, a mobility aid solution for people with reduced mobility.
- **GT Engineering**, hybridisation kit for urban vehicles.

# IN FIGURES

THE NORD-PAS DE CALAIS: ONE OF THE LARGE INTERNATIONAL REGIONS FOR MOBILITY

**1<sup>st</sup>** RAIL REGION IN FRANCE, **10 000** JOBS, **4** GLOBAL MANUFACTURERS

**1<sup>st</sup>** AUTOMOTIVE REGION IN FRANCE, **36 000** JOBS, **3** MANUFACTURERS,

**550 000** VEHICLES, **7** PRODUCTION SITES

**60 000** PROFESSIONALS

**300** BUSINESSES INCLUDING INTERNATIONAL LEADERS:

ALSTOM, BOMBARDIER, SIEMENS, EUROTUNNEL, RENAULT, PSA,

TOYOTA, VALEO, VISTEON, BRIDGESTONE, FAURECIA, ETC.

**10** TESTING CENTRES AND SPECIALISED TESTING

**1** EUROPEAN RAILWAY AGENCY

**1** RAILWAY CERTIFICATION AGENCY

**1** RAILWAY TESTING CENTRE

**1** INTERNATIONAL RAIL ORIENTED I-TRANS COMPETITIVENESS CLUSTER,  
DEDICATED TO INNOVATIVE TRANSPORT SYSTEMS

**1** RAILWAY INSTITUTE OF TECHNOLOGICAL RESEARCH IN FRANCE - RAILENIUM

**1** TRANSALLEY TECH HUB

AT THE UNIVERSITY OF VALENCIENNES AND HAINAUT-CAMBRÉSIS:

**7** RESEARCH LABORATORIES INCLUDING **2** UMR CNRS AND **1** LABEL CARNOT ARTS

**10** PATENTS **80** ONGOING PUBLIC/PRIVATE PARTNERSHIPS

**1** SUBSIDIARY DEDICATED TO DEVELOPMENT ACTIVITIES **2** START-UP

**475** RESEARCH STAFF AND **200** PHD STUDENTS



# Université de Valenciennes et du Hainaut-Cambrésis

**MORE INFORMATION AT:**  
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