

# ISAT - Institut Supérieur de l'Automobile et des Transports

## Master in Automotive Engineering and Sustainable Mobility

The Master Degree in “**Automotive Engineering and Sustainable Mobility**”, totally taught **in English**, aims at studying the whole dimension of a complex system such as an automobile, enhancing the aspects of Mechanics, Energetics and Embedded Electronics, in the real context. Its focus is on “Research & Development” and leads to further doctoral studies.

The course comprises 3 semesters of study, and a 1-semester period dedicated to an internship in a research centre completes this programme.

### OBJECTIVES

The evolution in research tools with regard to mechanics, materials, energetics and electronics allows today’s researchers to envision the study of total product performance. Closer to industrial preoccupations, as a result the scientific approach confronted by researchers studying and modelling systems becomes more and more complex with varied interactions, which necessitate a direction of research among global and holistic approaches.

### Course Structure

In order to meet these objectives, the student has to master at least 3 scientific fields on which an automotive system is based. A strong background either in Mechanics or Materials or Electronics is required. Thus the applicant must be a graduate of one of those fields or of Applied Mathematics; she/he must show excellent results in a Bachelor’s degree and strong motivation.

Each semester has a value of 30 ECTS credit points.

#### 1<sup>st</sup> semester :

Subjects of study	Lectures
Introduction	Technological Culture in Transportation Systems
Mechanics	Automotive Materials
Electronics, Embedded Data Acquisition Systems	Systems of Signal Capture and Chain of Embedded Measurements
Electronics	Measurement and Data Interpretation
Energetics	Transportation Energetic, General Aspects
Energetics	Heat Transfer and Aero-Thermo Chemistry

#### 2<sup>nd</sup> semester

Electronics	Complex Data Processing
Electronics	Software Architecture and Real Time Programming

Energetics	Transport Energetic, Application
Energetics	Aero-Thermo Chemistry, Application
Mechanics	Damage, Rupture
Mechanics	Fatigue, Transient Dynamics and Crash

### 3rd semester

Electronics	Human-Machine Interface and Behavioural Learning
Electronics	Theory of Decision Making, Active Security and Diagnosis
Energetics	Engins
Energetics	Measurements and Simulation of Engine and Power Train
Mechanics	Calculus of Structures, Finite Elements Method
Mechanics	System Design

### **Tuition Fees**

\* Tuition fees for the full course:

EU Students: 3 500 €

Non-EU Student: 5 000 €

### **Admission Criteria**

Outstanding achievement is required in the applicant's first degree, which must be equivalent to Second Class Honours degree or equivalent in Engineering, Mechanics, Physics or in an related discipline.

Language ability: the course is taught in English and candidates must meet the required standard of TOEFL: 550 (computer based 213) or IELTS: 6,5

Students participating in a European mobility programme may be admitted to Master courses within the framework of their own curriculum, and be evaluated under the same conditions as French students.

### **Institut Supérieur de l'Automobile et des Transports (ISAT)**

The **Institute of Superior Automotive and Transport Engineering (ISAT)** in Nevers (France) is the only Public *Grande Ecole* (the very selective French Higher Education Institution) committed to the comprehensive training of engineers for the automotive sector.

At ISAT, we are a team of over 50 professors whose aim is to cover **the entire range of tasks and skills related to the automotive and transport industries**, with a strong expertise in mechanics, energetics and electronics.

With the **Formula 1 circuit "Magny-Cours"** nearby, our students are able to experience first-hand leading automotive technology that serves an educational purpose as well as a recreational one.

We are also committed to developing **research within our Research Centre focusing on vibration, acoustics, composite materials and energetics (DRIVE)**, as well as in our **centre for technology transfer located on the Formula 1 circuit**.

Our facilities are comprised of an 8000 m<sup>2</sup> campus with 5000 m<sup>2</sup> for teaching and 3000 m<sup>2</sup> dedicated to student life, as well as computer labs (Office, CAD, and virtual prototyping) and specific equipment: engine test beds, vibration/noise measuring chamber, multi-axis testing machines, scanning electronic microscope.

Prime contributors in ISAT activities to the wide field of Automotive and Transportation are closely involved with us: Alstom Transport, Dupont de Nemours, Amorim (Portugal), Artec, EADS-Airbus, Faurecia, Eurocopter, Renault, CEA, Materials Group (Grande-Bretagne)

CREDIT TRANSFER: Each course is equal to an amount of 5 European credits (ECTS). UE courses are validated and transferable, and will therefore be awarded as long as a minimum weight equal or higher than 10 out of 20 is achieved.

### **CAREER OPPORTUNITIES**

- Engineers responsible for industrial projects and services
- Research and development engineers for large companies and organizations
- Further Doctoral studies

### **Application Procedure**

The documentation required is as follows:

- Letter of application outlining rationale for wanting to undertake the programme
- Curriculum Vitae
- Official copy of a Bachelor's degree or equivalent with transcript of records (English translation)
- Two referees and their address, preferably from the university or institute that awarded the first degree, who will be subsequently contacted by ISAT
- A copy of valid ID documentation and passport

Please check on <http://www.isat.fr>

Application forms should be sent to:  
Prof Pierre LOONIS  
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