

ISOT

Institut Supérieur de l'Automobile et des Transports

MAKE ENGINEERING
MAKE THE FUTURE



CONTENTS



Why choose ISAT?.....	2
Training courses.....	3
Standard course	4-5
Apprenticeship.....	6
Masters programmes	7-8
Networks & partners - ISAT global	9
Employment & student life	10
Student Associations.....	11
Research	13
Technology transfer	14
Equipment.....	15

WHY CHOOSE ISAT?

2

ISAT, Institut Supérieur de l'Automobile et des Transports, located in Nevers (2 hours south of Paris and close to the famous Nevers Magny Cours racing circuit) is a unique state-run college part of the Université de Bourgogne. ISAT is a dynamic, public school recognized for its industry-related expertise. More than 600 students, a total of 100 tenured teachers, researchers and industry professionals have chosen ISAT.

Shape your professional future with tailored and top-level training covering a large range of positions and skills related to the automotive and transport industries. ISAT endows its students with strong engineering expertise allowing them to take up positions in R & D, design, industrialisation, manufacturing, quality control, purchasing, etc. ISAT not only offers R & D activities but also high-level industrial services in transport.

SHAPE YOUR PROFESSIONAL FUTURE WITH TOP-LEVEL TRAINING & EQUIPMENT

- ◆ in the heart of the Nevers Magny-Cours high-tech cluster of businesses specialised in the competitive development of vehicles of the future
- ◆ renowned research laboratories: "DRIVE" EA 1859, two public/private laboratories: Id-Motion & Dynawel and a technology transfer centre: Welience/SATT Grand Est
- ◆ international network: every year over 40 partner universities and companies welcome more than 150 students for internships or semesters abroad.



ISAT TRAINING PROGRAMMES

Programmes at ISAT are dedicated to training students at all levels: studies, personal development, enriching cultural and community life.

Studies are semester-based and give all students the opportunity to study or carry out an internship abroad while specializing along the studies according to their professional project.

The ISAT engineer combines both a solid technological & scientific background and a high-calibre practical expertise. For executive positions in all the automotive and transport industries.



ISAT offers two training programmes (standard and apprenticeship) accredited by the Commission des Titres d'Ingénieur, one international Masters degree and one Research Masters degree, lifelong training in the following specialities:

- ◆ structures & materials
- ◆ intelligent and autonomous vehicle
- ◆ comfort & vehicle behaviour
- ◆ biomechanical ergonomics
- ◆ design & methods
- ◆ technological sourcing
- ◆ energy vehicle & environment
- ◆ transport infrastructure & networks

HOW TO ENROL AT ISAT?

1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
STANDARD ENGINEERING COURSE				
Student records & interview for international admissions	Student records & interview for international admissions	Student records & interview for international admissions	MIT Mechanical & Transport Engineering department	Materials & structures Comfort & vehicle behaviour Design & manufacture
		DÉPARTEMENT EPEE Energétique, Propulsion, Electronique & Environnement	Vehicle energy & environment Intelligent vehicle	
		TRANSPORT INFRACTURURE & NETWORKS		
		ENGINEERING APPRENTICESHIP COURSE		
Student records & interview for international admissions	Student records & interview for international admissions	Student records & interview for international admissions	MECHANICAL DESIGN & TECHNOLOGICAL INNOVATION ENGINEERING DEGREE	Biomechanical ergonomics Technological sourcing
		MASTERS		
		AESM - English-taught Automotive Engineering for Sustainable Mobility	Student records & interview for international admissions	MEetING Mechanics & engineering
Further details: ▶		communication_isat@u-bourgogne.fr	◀	
			Student records & interview for international admissions	

STANDARD COURSE

VEHICLE & TRANSPORTATION
ENGINEERING DEGREE
EUR ACE LABEL - 130 GRADUATES PER YEAR

▶ Hands-on learning, experimentation and innovative thinking

- ◆ ISAT provides an entire year of industrial experience through corporate internships during the 2nd, 4th and 5th year.
- ◆ ISAT is a key hub and network in the automotive & transportation field allowing the student-engineers to carry out research, design, production or industrialisation projects in French or international companies: Danielson Engineering, Oreca, SNCF, Look Cycle International, Texys, U-shin Valeo, Tokai Anvis, National Instruments, Renault, Renault Trucks, PSA, Bosch, Audi, Porsche, Technical Studio, Volvo, Areva, etc.



- ◆ Almost a hundred industry professionals : motor cars and transport, human resources, sourcing...

4 ▶ Personalised professional project

- ◆ Each student is supported by the educational team to individualise his or her professional training by choosing between 3 specialisations: MIT Mechanical & Transports Engineering or EPEE Powertrain, Electronics & Environment or Infrastructures & Transport Networks and 8 different options in the last year.

▶ Inductive training with hands-on students' projects

- ◆ Third-year students participate in different kinds of projects: industrial & innovation projects, student challenges and motorsport race competitions such as ISAT Formula Student, ISAT Eco Marathon, ISAT Eco Rallye, ISAT Kart Team,...

▶ Open your mind while doing internships and study semesters abroad

INNOVATION IN THE TEACHINGS: NEW DEPARTMENT

The Infrastructures & Transport Networks department offers courses in transport systems, law, sociology, new mobilities, transport infrastructures, engineering and impacts, traffic management and student project. The goal is to train engineers experts in designing and developing sustainable and multi-modal mobilities, in charge of the management, safety and maintenance of road and rail networks on urban and inter-urban scales

Mechanical and Transport department (MIT)

Prep Cycle	3 rd Year		4 th Year		5 th Year	
	S1	S2	S1	S2	S1	S2
Science & technology	Core subjects	Core subjects	Internship (16 weeks)	Core subjects	Material & structure	Internship (24 weeks)
Social science	+ specialisations :			<ul style="list-style-type: none"> Acoustics Dynamics of structures Tribology Value analysis of R & E Material behaviour (structures & materials) System reliability Vehicle dynamics 	<ul style="list-style-type: none"> Composite structure Fracture mechanics Fast and dynamic crash Structural assemblies Eco design Project 	
Basic Sciences	<ul style="list-style-type: none"> Construction & fabrication Optical / light / vision 	<ul style="list-style-type: none"> Electricity Characterization & implementation of materials 				
Optional Modules					Design & processes	
Internship in 2 nd year (1 month)					<ul style="list-style-type: none"> Product design Continuous progress tool Robotics & Machine vision Product lifecycle Advanced manufacturing technology Project 	

Energy, Powertrain, Electronics & Environment Department (EP2E)

Prep Cycle	3 rd Year		4 th Year		5 th Year	
	S1	S2	S1	S2	S1	S2
Science & technology	Core subjects	Core subjects	Internship (16 weeks)	Core subjects	Vehicle energy & environment	Internship (24 weeks)
Social science	+ specialisations :			<ul style="list-style-type: none"> Real time programming Heat exchangers Supersonic aerodynamics Powertrain modeling and measurement Energy balances of vehicles Electronic systems Electric / hybrid engines and transmissions Powertrain simulation (fluent, GT power) 	<ul style="list-style-type: none"> Energy collection & storage Powertrain innovative, alternative fuels Modeling & optimization of engines Emissions-compliant combustion engines Networks & infrastructure diagnostic of vehicles Project 	
Basic Sciences	<ul style="list-style-type: none"> Aero-thermochemistry Fluid dynamics and turbulent phenomena 	<ul style="list-style-type: none"> Flow visualisation C programming 				
Optional Modules						
Internship in 2 nd year (1 month)						

APPRENTICESHIP COURSE

MECHANICAL DESIGN ENGINEERING DEGREE IN PARTNERSHIP WITH ITII BOURGOGNE



► The apprenticeship course is oriented towards mechanics, the design of products and innovative processes. Depending on the chosen specialisation, the course integrates ergonomic and biomechanical dimensions or technical procurement and awareness of the technological market.

- ◆ the course includes 84 weeks in a company and 60 weeks of courses
- ◆ the student holds the position of a student-employee (with a salary of ~ 850 euros/month)
- ◆ this vocational training is built around a scientific & technological core curriculum with a major in Mechanics.
- ◆ additionally, students choose between "biomechanical ergonomics" or "technological sourcing" options.



- ◆ Training available for French and EU students only.

Contact: apprentissage.isat@u-bourgogne.fr

ITII de Bourgogne ranks first in France among the ITII Institut des Techniques d'Ingénieur de l'Industrie part of the UIMM (Union des Industries et des Métiers de la Métallurgie and Université de Bourgogne).

MASTERS

MEetING MASTERS

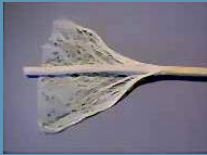
mechanics & engineering

The MEetING Masters focusing on mechanics and engineering trains students to analyse multi-physical phenomena associated with materials & structures or vibration & acoustics.

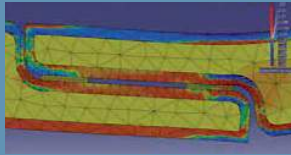
What are students' future prospects?

Further to their training, MEETING Masters graduates can:

- ◆ continue with a PhD in public or private research organisations
- ◆ move into positions such as managing engineers in R&D, especially in large, cutting edge industrial groups



bio-based materials



layers and patches



vibro-acoustic behaviour on complex mechanical structures

Double Master degree possible with Polytechnica Bucharest University.

Contact : master_meeting.isat@u-bourgogne.fr

AESM MASTERS

Automotive Engineering for Sustainable Mobility



This two-year Masters degree is entirely taught in English and specialises in Energy Management & Control. Graduates will become experts in the latest and most promising new technologies such as alternative fuels, eco-design, bio-composites & sustainable manufacturing, as well as all aspects of mechanics, energy and embedded electronics. They will also benefit from a sharp focus on R & D and receive excellent preparation for PhD studies.

Contact : master_aesm.isat@u-bourgogne.fr

Luke Stover, Class of 2015

"Before entering the Automobile Engineering for Sustainable Mobility master's program, I knew I wanted to get involved in sustainable energy, but lacked the direction of a career. During my three semesters between Polytech Orléans and ISAT Nevers Magny-Cours, I was able to take a wide range of courses relevant to the automotive industry. The professional experience of the faculty outside of academia offered an excellent blend of theory and applied sciences, along with an excellent professional network. I was fortunate to have two internships, one in research working with the test benches at PRISME Laboratories, and the other in industry as an engineering consultant at Segula Matra Technologies. With experience inside and outside the classroom I was able to find my main interest in energetics. Before my internship has been completed I was able to secure a doctoral research position at the CIRAD research facility in Montpellier. My semester at ISAT was particularly enjoyable due to the small size of the school allowing for easy integration with students and staff. Outside of class there were numerous extra-curricular activities within the school or locations such as the Morvan and Magny Cours."



my sports skills and emerge as an athlete. ISAT ensures that their students receive practical knowledge and skills that are not only relevant to automotive technology but are directly applicable to the company objectives and emerge as a competent professional. Based on its track record, I would highly recommend ISAT to anyone eligible to pursue this advanced Master's degree."



Tariq Kareemulla, Class of 2014

"Life in Orleans and Nevers were both great. Polytech Orleans & ISAT are extra-ordinary universities to pursue master's the faculty, staff, facilities, colleagues, etc. are top notch. I couldn't have asked for a better combination.



About life in France as a student, the experience was definitely one that is remarkably delightful. The people were always very kind, courteous, and always so helpful. The FLE – French as a foreign language- course helped all of us pick up the language and I improved my fluency day by day through my interaction with colleagues and native students.

Zeeshan Shaikh, Class of 2015

"Graduated with an international Master's program in Automotive Engineering for Sustainable Mobility (AESM) from ISAT in the year 2015, I am currently working with the consulting company HTi Automobile for their client PSA Peugeot Citroën as a R&D Powertrain Engineer. My education with ISAT helped me acquire solid skills and competence which made it smooth for me to emerge as a successful engineer at work. My activity consists of simulation and analysis of the powertrain on softwares like MATLAB/Simulink & INCA focusing on Automatic Transmission in order to optimize the performance and increase the economy without compromising on the overall performance.



The facilities at both institutions were fantastic, the numerous practical sessions & projects. The teaching approach and the way the course is structured was indeed a fascinating experience. Thanks to the superb Polytech Alumni network, in the final semester, I found an internship at Aurock. My industrial mentor who was an alumnus of the same school prepared me so well and I was ready to go ahead and pursue my PhD in the industry via the ANRT sponsored CIFRE program. During my internship the subjects Energy Storage & Recovery and Electrical Powertrains, taught by Prof. D. Chrenko and Prof. A-H. Aglzim were extremely useful. And presently during my PhD research in Hybrid Vehicle energy management via optimal control I use the teachings of the subject Powertrain control taught by Prof. G. Colin on a daily basis. Also the project at the end of the first year, Hybridization of a small urban car, was a crucial practical experience that helped me discover more about sustainability.

In the final year, the school with their enormous links and contacts supported me with my internship at Valeo Transmission, Amiens working with their NVH team. This experience was intensely valuable as it underlined the link between university study and real world problem-solving.

ISAT also gave me a perfect platform to prove

Master AESM truly is a hands-on opportunity acting as a foundation platform paving way for a bright illustrious career in sustainable automotive R & D."

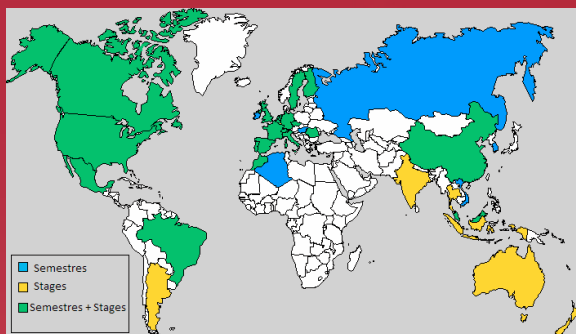
NETWORKS & PARTNERS

ISAT is a key hub and network in the automotive & transportation field:

- ◆ CDEFI French Engineering Schools Directors' Conference
 - ◆ Polytechnicum Bourgogne Franche Comté
 - ◆ FEEIAT (Fédération Européenne des Écoles d'Ingénieurs de l'Automobile et des Transports)
-
- ◆ Clusters: MOVEO, ASTECH, Agro Materials
 - ◆ Pôle de la Performance Nevers Magny-Cours
-
- ◆ SIA (Société des Ingénieurs de l'Automobile)
 - ◆ SEE (Société de l'Electricité, de l'Electronique, des Technologies de l'Information et de la Communication)
 - ◆ SFA (Société Française d'Acoustique)
 - ◆ AMAC (Association pour les Matériaux Composites)
-
- ◆ "Elles Bougent": association for bridging the gender gap in engineering positions

9

ISAT GOES GLOBAL



ISAT holds over 30 bilateral agreements with partner-universities hosting our students worldwide in: Germany, Belgium, Brazil, Canada, China, Finland, Spain, Italy, Malaysia, Mexico, Hungary, Portugal, Romania, Czech Republic, the Netherlands, Sweden, Vietnam, the United States. Features of our international studies programme include:

- ◆ Compulsory semester abroad (an internship and/or a semester)
- ◆ ISAT exchange programmes (Erasmus, BRAFITEC, bilateral conventions, etc.)
- ◆ The learning of a second foreign language in addition to English is possible
- ◆ Possibility of a double degree (Sherbrooke University - Canada ; Bucarest University - Romania ; Valladolid University - Spain)
- ◆ 130 ISAT students study abroad every year enhancing both CVs and international experience

EMPLOYMENT

ISAT offers industry-recognised training and is recommended by the ISAT alumni network. More than 60% of ISAT students are recruited before graduating and 80% have jobs within 3 months.

The average starting salary is 37,000 per year in France with bonus.

Distribution of employment:

- ~65 % in the automotive branch & 25 % in other transportation fields
- ~70 % in R & D or engineering design-related positions
- ~20 % outside France.

Roxane Sina, 2011 year

"Automotive Calculation Engineer, specialised in engines. Danielson Engineering, Magny-Cours. My job consists in checking mechanical and thermal sustainability of spare parts. My fifth year internship at Danielson Engineering enabled me to master Abaqus, Optistruct, etc. : softwares that I use on a daily basis. Lessons in mechanic and material resistance provided me with the basic knowledge I needed to quickly be efficient. Likewise, the optional energetics course I took proved to be invaluable when working on motorization. Hobbies also played a major role in my preparation to get this job. For instance, rugby taught me team spirit. My job as vice-president of the student association responsible for the organisation of Gala de l'ISAT gave me the opportunity to manage a large-scale project."



Jérôme Aupest, 1996 year

"After getting a diploma (mechanics engineering) in an institute of technology, I started my studies at ISAT in 1992. I subsequently started working as a project engineer, which enabled me to build up my experience in the field of industrialization of new products, and also to discover the world of industrial projects. A new opportunity was offered in the way of becoming the supervisor of engine assembly methods at PSA PEUGEOT CITROEN, a car manufacturer for which I had the privilege to do my fifth year internship in 1996. This position enabled me to discover team management and to build up a substantial professional network. Studying at ISAT provided me with a sound mastery of English, which enabled me to work as an expat for FORD UK, to assist for two years the launch of a new engine production module. I am now in charge of the industrialization of a new diesel engine aimed at complying with the new Euro 6 regulation. I keep in touch with ISAT, and I organize a Lean Manufacturing course on a yearly basis, thus enabling ISAT students to visit one of the PSA production sites."



STUDENT LIFE

affordable & stimulating setting

Student life is enhanced by an activities programme including a dozen associations: student unions, I-StartUp club, sporting activities, musical practice and concerts, humanitarian actions (4L Trophy, academic support), entertainment (Gala, career fairs), motor-sport challenges (Bol d'Or Classic, car rallies, etc.)



ISAT offers dynamic surroundings for research and studies, including sport, nature, culture, etc. and all just 2 hours from Paris.

Located in the heart of France, ISAT benefits from advantageous relations with the community including its support for student life and industrial partners. ISAT is located within a protected area and historical town with all needed amenities which ensure the full development of the ISAT community through rich cultural and student life. ISAT boasts many high-level sports facilities and a renowned gastronomy. Thanks to the size and location of Nevers, there is no shortage of affordable student housing.

STUDENT ASSOCIATIONS

The students of ISAT have an intense associative life organized around two official federations:

- ◆ ISATECH, for any study activity and/or industry or vehicle production
- ◆ BDE, the student board, for all other activities and the traditional opening week-end

▶ ISAT Eco Rallye



The ISAT Eco Rallye aims to construct an alternative fuel prototype. Designed and produced by ISAT students, the vehicle is planned to compete at the Monte-Carlo New Energies Rallye.

▶ ISAT Formula Team



The Formula Student Challenge is a good opportunity for engineer students worldwide to develop and design their own single-seater.

- ◆ two categories: thermal and electric
- ◆ international competition
- ◆ support of international companies (BOSCH, AUDI, PORSCHE...)

▶ ISAT Fly



ISAT's first aeronautical engineering project places students in hands-on knowledge and experiment in the field of aeronautics. ISAT Fly organises training sessions for the French Aeronautics Initiation Certificate.

▶ ISAT Kart Cross



The project's goal is to design and build an all-terrain vehicle, reliable and efficient enough to take part in FFSA - French Motorsport Federation- races in the Super Sprint D1 category.

► **ISAT Kart Team**



This student competition started in 2010 under the sponsorship of the European Federation of Automotive & Transportation Engineering Schools.

Carts are designed and produced by students and have to cost less than 2000 excluding tax for thermal carts, and 3500 for electric carts.

An international challenge takes place each year with partner-universities.

► **ISAT Eco Marathon**



The goal of the ISAT Eco Marathon is to drive a maximum of kilometres with only one litre of gas. Every year, a new, motivated team works to optimise the thermal "Mona" prototype. Just like the Formula Student, "LISA", the electric version of the ISAT Eco Marathon, is operational. The ISAT Eco Marathon is not only a competition: it's also a technological, environmental and human challenge.

► **ISAT Rally Team**



The ISAT RALLY TEAM allows students to compete with a Renault 5 GTT in a rally. It is piloted by Jean RAGNOTTI and uses bioethanol & SP98. It also participates in many competitions in France. The short-term objective is to optimise the vehicle and to improve (running gears) & braking systems.

► **IsatMOT**



The goal of the ISATMOT team is to compete at the Magny Cours Bol d'Or Classic with a BMW R100 RS, which is constantly improved year after year by students. This is a good opportunity for them to gain knowledge regarding motorcycles.

► **ISAT Soap Box**



The ISAT SOAP BOX team designs and produces a non-motorized vehicle with the aim of participating in a downhill racing championship.

► **Your Project**



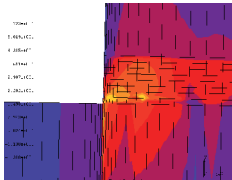
Give life to your project, your creativity, your team spirit and skills by starting off your own ISAT project. Each year, projects take off with the means and networks made available by ISAT.

Research Department in Vehicle Engineering for the Environment

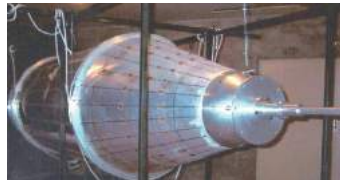
The DRIVE laboratory develops fundamental & applied research in fields linked to the transportation sector: powertrains, controls, intelligent vehicles, weight-reduction of structures & their assembly and acoustic & vibration comfort.

The DRIVE laboratory counts around 30 researchers who also double as teachers. In addition to fundamental research, teams are involved in innovative projects with strong potential for technology transfer. They develop tests, digital models and demonstrators. The DRIVE laboratory is composed of two competence teams:

- ▶ **Mechanics and Acoustics for Transport team:** weight-reduction of structures for comfort and safety, analysis and maintenance of aging infrastructure, vehicles and transport systems.
 - ◆ In “Sustainability & Composite Structures” research, composite materials are central to weight-reduction problems. These materials are studied and sized depending on their final use, incorporating all the aspects linked to their design, assembly and/or the stresses they must endure while in-service.
 - ◆ In “Transport Vibration & Acoustics” research, the weight-reduced & complex materials (foams & patches) are sized for vibration dampening and sound absorption.



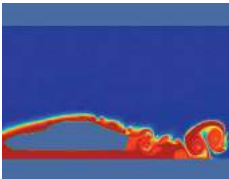
Modeling of simulations in assembly studies



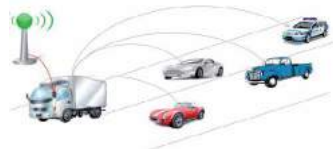
Modeling and experiments of a ATR 42 fuselage in reverberation

▶ EPEE team:

- ◆ “Energy & Powertrain” research focuses on high-performance engines of the future within the framework of sustainable development.
- ◆ “Intelligent Transport Systems” research focuses on embedded & ICT systems.



Numerical simulation of aerodynamic flow around a vehicle



Vehicle communications

TECHNOLOGY TRANSFER

The French Technology Transfer Accelerator Company

SATT Grand-Est/WELIENCE is an ISO 9001, SRC and CRT-certified company with a challenging mission to accelerate the translation of research into innovations. Located in Magny-Cours, SATT Grand-Est is the R&D centre associated with the ISAT research laboratory.

Services include:

- ◆ material and structural testing
- ◆ vehicle dynamics and acoustics
- ◆ design/simulation/development

www.welience.com

Contact : direction.isat@u-bourgogne.fr

Private and public laboratories with state-of-the-art research for small & medium-sized companies

14



Engine Design & Manufacturing

Id-Motion : high efficiency powertrains R & D, and sustainable mobility solutions research.

The group of scientific interest (GIS) Id-Motion including ISAT and Danielson Engineering is located in Nevers-Magny-Cours. Its objective is to develop knowledge and innovation in the field of alternative fuels and high-efficiency powertrains.

Services include:

downsizing, hybrid engines, combustion, combustible fuels, thermal recovery, track-testing.

www.id-motion.eu

Contact : luis.le-moyne@u-bourgogne.fr

Dynawel : research in innovative vehicle comfort solutions

Dynawel is a laboratory whose services are shared between ISAT and ANVIS, a company whose goal is to develop innovative technologies in the field of vibration and acoustics, applied to vehicles, especially hybrid and electric ones.

www.welience.com

Contact : direction.isat@u-bourgogne.fr

STATE-OF-THE-ART EQUIPMENT

Six experimental platforms with advanced technical equipment are available to our students and partners:

- ▶ Mechanical engineering & composite materials: scanning electron microscope, multi-axis mechanical testing machines and polymer injection press



- ▶ Vibration & acoustics: vibration/noise measuring chamber



- ▶ Energy: engine test beds, vehicle dynamo-meter



- ▶ Information technology & electronics: National Instrument acquisition hardware and software, LabView Academy, driving simulator



- ▶ Manufacturing processes: machining centre, CATIA workstations computer labs: CAD, high-speed prototyping, 3D scanner

Our sets of equipment, our laboratories and our researchers are at the disposal of the bearers of project to design or demonstrate a concept;

Contact : communication_isat@u-bourgogne.fr

Completing one's studies at ISAT is a good opportunity to gain competencies and experience that have satisfied many partners (Airbus, Alstom Transport, Dassault Aviation, EADS, Renault, PSA, etc.).

Open Day on the first Saturday in March,
COME & VISIT US!



www.isat.fr

Institut Supérieur de l'Automobile
et des Transports ISAT®

49, rue Mademoiselle Bourgeois
BP 31 - 58027 NEVERS Cedex
FRANCE

Information:

Tél. + 33 3 86 71 50 00

Fax + 33 3 86 71 50 01

communication_isat@u-bourgogne.fr

WWW.ISAT.FR

Follow us:



 YouTube

 LinkedIn