MS MASTÈRE SPÉCIALISÉ

SPATIAL

AÉRONAUTIQUE

AUTOMOBILE

FERROVIAIRE

NAVAL

MOTORSPORT ENGINEERING PERFORMANCE

POST-MASTER DEGREE

1 year to acquire high-level skills and expertise in motorsport

100% in english

ESTACA
ECOLE D'INGENIEURS

GROUPE isae

A UNIQUE PROGRAM IN FRANCE TO MEET THE NEEDS OF THE COMPETITIVE MOTORSPORTS SECTOR

Competitive motorsports need qualified engineers specially trained to work in this sector. The Motorsport Engineering Performance Post-master's degree answers this need with a course that builds high-level skills and expertise in the Motorsport sector.

Developed jointly with French companies, this MS® provides training in design, optimization and organization of all the technical solutions in the Motorsport sector, but also mastery of special production and manufacturing methods.

PROGRAM IN BRIEF

AIM

Acquire the skills to :

> Design, optimize and organize all the technical solutions
> Master and implement product manufacturing methods
> Take account of the productivity and quality imperatives of the Motorsport sector.

PROGRAM BENEFITS

> Teaching faculty involved in the Motorsport sector
> Concrete and practical project-based approach.

SKILLS ACQUIRED

> Identify the different categories, race tracks and regulations in motorsport
> Understand the sensor technology, analyze signals for reliability, analyze and create performance tools to present quantifiable results for car development / performance
> Identify race vehicle architecture, make and analyze dimensioning calculations, pilot and analyze mechanical tests, propose new solutions, optimise a structure, get to know "new" materials
> Define aerodynamic principles, identify aerodynamic phenomena, conduct and analyze wind tunnel tests, use CFD for analysis, organize track trials
> Identify the architecture of a combustion engine, an electric, hybrid and hydrogen engine
> Analyze gearbox technology
> Identify the materials used in tyres, analyze tyre behavior, analyze the impact of tyres on performance
> Analyze pilot behavior, identify track safety, perform driving analysis on track and on simulator
> Manage projects, write reports, communicate and speak in public.

700 HOURS OF ACADEMIC COURSEWORK including a industrial project followed by a professional thesis (October to February).

6 MONTHS MINIMUM of in-company operational training (March to August).

ASSESSMENT

> Teaching modules assessed via exams and case studies
> Academic project & Professional thesis assessed via a report and a presentation.

JOB PROSPECTS

> R&D Engineer: design engineer, structural engineer, calculation engineer
> Aerodynamics: aerodynamicist engineer, CFD engineer, wind tunnel engineer, aerodynamic track engineer
> Powertrain: powertrain design engineer, powertrain control engineer, engine support engineer
> Electronics: system engineer; electronic engineer
> Track operations: data engineer, performance engineer, track support engineer, strategy engineer, simulation engineer, DiL engineer
> Management: technical director, project leader, technical project manager, coordinator.

COURSE BREAKDOWN: lectures, case studies, team work project and management.

LANGUAGE: english

NUMBER OF CREDITS: 75 ECTS

PROGRAM

INTRODUCTION TO MOTORSPORT
100 Student Hours - 7 ECTS

> Data processing with Matlab
> Basic network architecture and electronics
> Introduction to thermal engine and gearbox
> Driver coaching and driving (FFSA)
> Analysis of data on a simulator (WINTAX)
> Operating a Formula 4 on track (FFSA)
> Track safety
> English for Motorsport

DESIGN OF A RACING VEHICLE: THE FUNDAMENTALS
70 Student Hours - 6 ECTS

> Regulation analysis and impact on the race car design
> Basic of a racecar
> Basics in pneumatic tyre knowledge
> Basic vehicle dynamics knowledge and performance parameters
> Basic embedded systems

RACING VEHICLE AERODYNAMICS
35 Student Hours - 3 ECTS

> Motosport Aerodynamics Performance Engineering
> CFD optimization

POWERTRAIN DEVELOPMENT
60 Student Hours – 6 ECTS

> Combustion engine structure
> Transmission and gearbox
> Electrification and Energy Management in Motorsport
> Hydrogen Powertrain in Motorsport
> Hybrid process and monitoring systems
> Low carbon fuels

SIMULATOR FOR MOTOR RACING
30 Student Hours - 2 ECTS

> Design and operation of a simulator for motor racing - Basic
> Design and operation of a simulator for motor racing - Artificial Intelligence

TRACKSIDE OPERATION TOOLS
70 Student Hours - 6 ECTS

> Settings of a racecar: recommendations and applications
> Organisation of a team on the track
> Race event preparation
> Sensor and data acquisition in race vehicules
> Development of performance analysis tools (Motec)
> Race strategy on Trackside software
> Driver behaviour analysis on ESTACA simulator
> Race preparation on a circuit, in collaboration with students of the Meka association

INDUSTRIAL PROJECT
200 Student Hours - 15 ECTS

PROFESSIONAL THESIS
110 Student Hours - 10 CTS

IN COMPANY OPERATIONAL TRAINING
24 Weeks - 20 ECTS

Note: the above program might be subject to minor changes.

A PROGRAM DESIGNED JOINTLY WITH INDUSTRIAL PARTNERS

This training course is proposed in partnership with the FFSA Academy (French Federation of MotorSport) that prepares young drivers and mechanics from all around the world in order to reach the motorsport's world top level.

It covers the construction of the program, joint teaching of course modules, the availability of business experts and the team premises for "Industrial Project". ESTACA aims to meet the human, technical and operational needs of companies working in the competitive motorsports sector.

Among the companies and federations involved in the program are the FIA, Renault Sport Racing, Automobile Club de l'Ouest and Peugeot Motorsport.

ACQUIRING THE SKILLS REQUIRED TO GET YOUR DREAM JOB

Since I was a child, I've been into motorsports. I chose a general engineering school because I wasn't sure if I wanted to make a career out of it. But once I'd graduated, I started looking for a job in this sector.

All I got was rejection. So I decided to continue my studies at ESTACA. This course gave me the technical knowledge I needed to enter this highly specialized field. Classes are taught by engineers actually working in motorsports, making them highly practical and covering current technologies. My internship in Germany as a Data Support / Performance engineer in GT3 at HRT, Haupt Racing Team, gave me the opportunity to confirm my knowledge through practice, and also my career choice!

Julie SCHOTTER,
2024 graduate, Data Support and Performance Engineer at HRT

STUDY CLOSE TO MOTORSPORTS RACING CIRCUITS

ONE PROGRAM – MANY OPPORTUNITIES TO MEET MOTORSPORT SPECIALISTS

> **ESTACA-LAVAL**, in the Mayenne department (1½ hours from Paris by TGV) is the headquarter of the program where courses take place.
> **FFSA** – Le Mans Bugatti Race Track holds 3 days of training on track with young drivers and performance engineers
> **ACO** – Le Mans offers an inside look at the organization of one of the biggest motorsport events in the world
> **Speakers and teachers** from all over Europe share their passion and involvement in the Motorsport Industry.

ESTACA GRADUATE ENGINEERING SCHOOL

Founded in 1925, ESTACA is a member of ISAE Group, 1st world cluster in aerospace training and research.

ESTACA is highly specialized in the fields of space, aeronautics, automotive, railway, and naval transport industries.The training courses constantly evolve to meet the requirement of companies and adapt to the emergence of new technologies or disciplines.

ESTACA's graduates undertake the design, development and production of transport systems and components.The school's expertise is well recognized by the industry, which has ranked it among the best engineering schools for the quality of its graduates.

ESTACA IN FIGURES

3
campuses: ESTACA Paris-Saclay, ESTACA Laval and ESTACA Bordeaux

450
graduates per year

2,850
students

11,000
alumni

2
research teams

ISAE IN FIGURES

Group of the 5 most prestigious French engineering programs in Aerospace: SUP'AERO, ENSMA, SUPMECA, ESTACA, École de l'Air et de l'Espace, ENAC

6,000
students at a high scientific level in aerospace

475
doctoral students

68,000
alumni

700
faculty, researchers and engineers

PRACTICAL INFORMATION

ELIGIBILITY

This program is open to all foreign and French students holding a Master Degree (preferably in scientific fields, business master may also apply). Applicants proving 3 years of professional experience should have completed four years of studies in an engineering (Master Level or Advanced Bachelor). Applicants should have English language proficiency (TOEFL iBT: 91, TOEIC: 850 or IELTS: 6.5).

LOCATION

ESTACA-Laval, Le Mans

TUITION FEES

16,000€ (reduced fees for students graduating in the year and ESTACA Alumni: 14,000€)

ADMISSION PROCESS

Admission upon application, possibly with an interview.

> Application Form available on the website: www.admissions.estaca.fr
> Application period: application is to be sent before May 30th for non-european students (visas requirements) and July 30th for European students
> Limited number of places.

DEGREE ACCREDITED BY THE CONFÉRENCE DES GRANDES ECOLES*

www.cge.asso.fr

** The « Conférence des Grandes Ecoles » is a French national institution that represents the best Graduate Engineering Institutions accredited by the Commission des Titres d'Ingénieur (CTI) to deliver the French Graduate Engineer Diploma equal to a Master's degree.*

ESTACA Laval

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