MASTER

College of Science and Technology

Transfers-Fluids-Materials in Aeronautical and Space Applications (TFM-ASA)

Program factsheet

Academic cooperation

Consortium of three universities:

- **Germany**: Brandenburg University of Technology Cottbus-Senftenberg (BTU)
- **Belgium**: Université catholique de Louvain (UCL)
- **France**: University of Bordeaux (UBx)

Level

- Students who successfully complete this international Master program in Engineering Sciences, including the compulsory mobility period, receive a joint French/German and Belgian diploma.

Admission requirements

Candidates must fulfill the following requirements:

- Hold a Bachelor degree in the fields of Engineering, Sciences and/or Technology.
- Provide strong academic records within the domain of sciences, particularly in solid and fluid mechanics, thermal sciences, thermodynamics and material sciences.

Program duration

2 years (120 ECTS)

Language requirements

All courses are taught in English.

- Students from English speaking countries must provide an official letter from the university confirming that English is the language of instruction.
- For other students, the TOEFL* or IELTS** test must be passed before applying for the Master. For TOEFL, a minimum of 550, 213 or 79 points respectively for paper-based, computer-based and Internet-based TOEFL/TOEIC test is required. Marks of at least 6.0 (out of a total of 9) are required for IELTS test.

Participation fees

Students pay common participation fees which cover the national enrolment fees and services of each partner university.

Program outline

The TFM-ASA program combines studies and research based on aerodynamics, thermodynamics, compressible flows, turbulence, propulsion, combustion, turbomachinery, material science, to name a few. These themes are all directly connected with technical and fundamental studies as well as with aircraft, spacecraft, drone issues, etc.

The program is jointly managed by three academic European partners (France, Germany and Belgium) together with the support and expertise of:

Bordeaux / France:

- Industrial partners such as IRT St Exupery (Technological Research Institute), BAAS Society (Bordeaux Aquitaine Aéronautique et Spatial) and Aerospace Valley.
- Leading research laboratories, strongly involved in the aeronautic field such as I2M, LCTS, IMB (UBx).

Louvain-la-Neuve / Belgium:

- Applied Research Center CENEARO.
- Research Laboratories: IMMC (UCL).

Cottbus-Senftenberg / Germany:

- Closed collaborations with space agencies (ESA, DLR), ROLLS ROYCE, MTU Aero Engines.
- Research Laboratory: CFTM² at BTU

These industrial partners provide specialized classes and internships to the program, thus providing the students with an overview about the actual issues faced by companies today.

The result is a top-quality, highly-renowned international Master degree that meets the 120 ECTS syllabus requirements and corresponds with current job market criteria.

UCL Université catholique de Louvain

btu Brandenburgische Technische Universität Cottbus - Senftenberg

université de BORDEAUX

Program structure

Semester 1: UBx, Bordeaux, France, **Semester 2**: UCL, Louvain-la-Neuve, Belgium, **Semester 3**: BTU, Cottbus-Senftenberg, Germany, **Semester 4**: Master thesis linked to the internship within a laboratory or a company.

Year 1 / Semester 1

Material Science and Structures (30 ECTS)

- Simulation and design of structures (9 ECTS)
- Continuum mechanics and finite element method applied to solid mechanics (6 ECTS)
- Fatigue and fracture (3 ECTS)
- Materials and aeronautical structures (6 ECTS)
- Non-destructive evaluation for aerospace applications (3 ECTS)
- Assembly-bonding (3 ECTS)

Year 1 / Semester 2

Aeronautical Engineering (30 ECTS)
4 mandatory courses out of 6

- Internal combustion engines (5 ECTS)
- Aerodynamics of external flows (5 ECTS)
- Fluid compressors (5 ECTS)
- Numerical methods in fluid mechanics (5 ECTS)
- Quality management and control (5 ECTS)
- Gas dynamics and reacting flows (5 ECTS)

Optional courses

- Advanced Numerical Methods
- Calculation of Planar Structures
- Aerodynamics of External Flows
- Thermodynamics of Irreversible Phenomena
- Plasticity and Metal Forming

Year 2 / Semester 3

Advanced Fluid Mechanics, Thermodynamics, Heat Transfer (30 ECTS)
3 mandatory courses out of 5

- Computational Fluid Dynamics (6 ECTS)
- Engineering acoustics - sound fields (6 ECTS)
- Modelling of turbulence (6 ECTS)
- Thermodynamics, heat and mass transfer (6 ECTS)
- Flow measurements (6 ECTS)

Two additional modules should be chosen with the following requirements:

- One module of the Department of Mechanical Engineering with a specialization in aerodynamics, fluid mechanics, aerospace engineering, materials science, aerospace.
- One module in the subjects of physics, mathematics or computer science

Year 2 / Semester 4

- Master thesis (30 ECTS)
- Internship in a research institute or a company, located preferably close to one of the three partners' locations but also anywhere in the world, upon prior acceptance of the Consortium.

Strengths

- International program taught by experts (academics and industrial partners) from three different universities in Europe.
- Joint French/German and Belgian Master degree.
- International mobility period in the partner countries (2 semesters).
- Close collaboration with industrial partners and research institutes with a guarantee of intensive training periods.

And after?

After graduation, students may access career opportunities such as:

- Engineers in companies / engineering departments of aeronautical and space sectors.
- Continuing their studies as PhD students and, after completion of their PhD, becoming postdoctoral researchers or assistant professors in universities or engineering schools.

How to apply?

Applications may be completed online:

- http://i2m.u-bordeaux.fr/master-TFM-ASA/index2.html

Deadlines:

- Mid-January: students applying for scholarship
- End March: self-financed students

Contacts

EXECUTIVE COORDINATORS

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CONSORTIUM COORDINATION

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Where?

Course locations in Bordeaux:

- University of Bordeaux (Talence and Mérignac Campus)
- ENSEIRB-MATMECA - Bordeaux INP (Talence Campus)
- ENSAM (Talence Campus)

Course location in Louvain-la-Neuve:

- Université catholique de Louvain (UCL)

Course location in Cottbus-Senftenberg:

- Brandenburg University of Technology (BTU)

More information:

www.u-bordeaux.com

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