ASIIN Seal & EUR-ACE® Label

Accreditation Report

Degree Programme
Cursus Master en Ingénierie IMSAT (Ingénierie et Maintenance des Systèmes pour l'Aéronautiques et les Transports) /
CMI Engineering and Maintenance for Aeronautical and Transport Systems

Provided by
University of Bordeaux

17 September 2021

Table of Content

A About the Accreditation Process 3

B Characteristics of the Degree Programme 5

C Peer Report for the ASIIN Seal 7

1. The Degree Programme: Concept, content & implementation 7
2. The degree programme: structures, methods and implementation 15
3. Exams: System, concept and organisation 22
4. Resources 26
5. Transparency and documentation 30
6. Quality management: quality assessment and development 33

D Additional Documents 36

E Comment of the Higher Education Institution (30.07.2020) 37

F Summary: Peer recommendations (09.08.2020) 38

G Comment of the Technical Committee 01: Mechanical Engineering/Process Engineering (03.09.2020) 39

H Decision of the Accreditation Commission (17.09.2020) 40

I Fulfilment of Requirements (17.09.2021) 42

Analysis of the peers and the Technical Committee 42
Decision of the Accreditation Commission (17.09.2021) 43

Appendix: Programme Learning Outcomes and Curricula 44

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Cursus Master en Ingénierie IMSAT (Ingénierie et Maintenance des Systèmes pour l'Aéronautiques et les Transports)	CMI Engineering and Maintenance for Aeronautical and Transport Systems	ASIIN, EUR-ACE® Label	Figure 2020-2025	TC 01

Date of the contract: 22.04.2020

Submission of the final version of the self-assessment report: 30.05.2020

Date of the onsite visit: 07-08.07.2020

at: Bordeaux University / Science and Technology College

Peer panel:

Prof. Luc Hébrard, Université de Strasbourg

Prof. Dr.-Ing. Otto Theodor Iancu, Hochschule Karlsruhe

Prof. Dr. Eike Stumpf, RWTH Aachen

Dr.-Ing. Matthias Wunderlich, Renault

Mathias Roesler, CMI Student, Sorbonne University

Representative of the ASIIN headquarter: Raphaela Forst

Responsible decision-making committee: Accreditation Commission for Degree Programmes

Criteria used:

European Standards and Guidelines as of 15.05.2015

ASIIN General Criteria as of 10.12.2015

[1] ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes

[2] TC: Technical Committee for the following subject area: TC 01 - Mechanical Engineering/Process Engineering

Subject-Specific Criteria of Technical Committee 01 –Mechanical Engineering/Process Engineering as of 09.12.2011

B Characteristics of the Degree Programme

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Cursus Master en Ingénierie IMSAT (Ingénierie et Maintenance des Systèmes pour l'Aéronautiques et les Transports)	Cursus Master en Ingénierie IMSAT	-Avionic maintenance engineering -Structural maintenance engineering -Composite material structure engineering -Embedded system engineering	7	Full time	No	10 Semester	360 ECTS	Fall semester (September) & fall semester 2012

For the CMI IMSAT (Engineering and Maintenance for aeronautical and transport systems) the institution has presented the following profile in the self-assessment report:

"The CMI IMSAT (Engineering and Maintenance for aeronautical and transport systems) is a study pathway of 5 years that allows the student to acquire skills and competences related to the design and the technological processes involved in the life cycle of multi-technology systems such as the ones encountered in aeronautics and transportation systems.

The CMI IMSAT training is based on the two following science and technology domains:

- Mechanical engineering

- Electrical engineering

applied in the industry sector of aeronautical maintenance and transportation systems.

Indeed, numerous job profiles require competencies in design, retro-engineering and modelling in both electrical and mechanical engineering domains along with advanced knowledge on reliability, logistics and maintenance processes.

Students choose a specialisation after the 3rd year among:

- Ingénierie Maintenance Aéronautique Avionique – IMAA (Avionic maintenance engineering);

[3] EQF = The European Qualifications Framework for lifelong learning

- Ingénierie Maintenance Aéronautique Structure – IMAS (Structural maintenance engineering);

- Ingénierie Structures Composites – ISC (Composite material structure engineering);

- Ingénierie Systèmes Embarqués – ISE (Embedded system engineering)."

Graduates are qualified for the following positions, among others: aircraft maintenance program manager, airworthiness manager, aircraft document manager, product planning and control manager, aviation operations support manager, supply chain engineer, measurement, test and control engineer, design and development engineer, quality manager.

These job profiles are mainly found at aircraft manufacturers, parts manufacturers / equipment suppliers, airline companies or maintenance, repair and overhaul companies, information technology service companies or in military aviation, research and development offices and research laboratories.

C Peer Report for the ASIIN Seal[4]

1. The Degree Programme: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)

Evidence:

- Module descriptions
- Objective Module Matrices for the CMI programme
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
For the CMI IMSAT, the University of Bordeaux presents the overall programme objectives and learning outcomes in the self-assessment report (SAR). The objective-module-matrices match the learning objectives of Figure network[5] with the specific learning outcomes of the CMI and the ASIIN subject-specific criteria (SSC). The matrices also detail the specific modules, which correspond to the intended learning outcomes. The peers appreciate the detailed overview and are satisfied that the intended learning outcomes match the individual modules of the curriculum.

The Figure network has defined the following learning outcomes for CMI:

1. acquisition of fundamental and disciplinary knowledge necessary for the specialisation and in order to operate in a multidisciplinary context

[4] This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

[5] The Figure network ("Formation à l'ingénierie par des Universités de Recherche", Reseau Figure) is an international network of universities that offer Master Courses in Engineering (CMI). The network members collaborated in establishing a training concept that is based on a coherent five-year programme, strong link with research and innovation in the curriculum, the relevance of graduate qualifications to the needs of companies and societies, the promotion of international openness and a culture of training quality (including an accreditation and monitoring process within the network). For more information see https://reseau-figure.fr/?lang=en

2. development of the capacity to select and apply analytical methods and tools , and to critically interpret results
3. the identification, formulation and resolution of real problems whilst taking account of technical and non-technical constraints (security, environment, economic & ethical factors)
4. development and design of new products at the cutting edge of disciplinary knowledge and technological advances
5. identification, localisation and acquisition of data
6. conception and execution of experiments, interpretation and exploitation of experiment results
7. use of digital tools and realisation of simulations in order to lead studies and research possible solutions
8. application of industrial and respect of safety and usage guidelines
9. awareness of economical, organisational and managerial issues
10. management of projects and professional and technical activities
11. integration of professional and technical knowledge to enable informed judgement and decision-making
12. use of various methods for clear, unambiguous communication
13. operation in an international, individual or team context
14. life-long training.

These 14 learning objectives have been further specified for the CMI IMSAT (see appendix for a detailed overview). The peers analyse the learning outcomes for the CMI and agree that they are consistent with the expectations of the European Qualification Framework Level 7 (equivalent to a Master's degree programme) as well as the respective Subject-Specific Criteria of the ASIIN Technical Committee 01 –Mechanical Engineering/Process Engineering. Furthermore, they comply with the standards and criteria of the EUR-ACE Label. The peers also note that the learning outcomes detailed by Figure align with the ENAEE learning objectives for the EUR-ACE label.

For example, the general CMI objectives 2 and 3 correspond to the EUR-ACE objective for Engineering Analysis:

- "ability to analyse new and complex engineering products, processes and systems within broader or multidisciplinary contexts; to select and apply the most appropriate and relevant methods from established analytical, computational and experimental methods or new and innovative methods; to critically interpret the outcomes of such analyses;
- ability to conceptualise engineering products, processes and systems;
- ability to identify, formulate and solve unfamiliar complex engineering problems that are incompletely defined, have competing specifications, may involve considerations from outside their field of study and non-technical – societal, health and safety, environmental, economic and industrial –

constraints; to select and apply the most appropriate and relevant methods from established analytical, computational and experimental methods or new and innovative methods in problem solving;
- ability to identify, formulate and solve complex problems in new and emerging areas of their specialisation";

while the general CMI objectives 12 and 13 correspond to the EUR-ACE objective of Communication and Team-working:

- "ability to use diverse methods to communicate clearly and unambiguously their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences in national and international contexts;
- ability to function effectively in national and international contexts, as a member or leader of a team, that may be composed of different disciplines and levels, and that may use virtual communication tools".

Based on the discussions with programme managers, industry partners, and alumni during the on-site visit, the peers conclude that the intended qualification profile allows the graduates to work as engineers in the aeronautical field, especially maintenance or other applied positions. It also prepares them for a PhD, which some graduates pursue in cooperation with the industry ("thèse cifre"). After the PhD, graduates often go into research and development. Industry partners, students, teachers and alumni are involved in the development of the study programme and the intended learning outcomes through different committees (see criterion 6).

The descriptions of the learning outcomes are clear and concise and are accessible to students and teachers via the module descriptions on the university website. In the SAR, the university points out that the learning outcomes written in the module description for the first three years of the CMI do not correspond to the ones presented in the CMI objective-module-matrix as these modules are shared with the Bachelor degree Sciences Pour l'Ingénieur (SPI, Science for Engineers). They further explain that the HEI plans to use the same learning outcomes for both the Master and the Bachelor degrees, namely the CMI learning outcomes (see appendix) and that updating the module description is scheduled for the next national accreditation in 2021. The peers agree that the CMI should use the same learning outcomes throughout the five years of the programme and ask the HEI to provide the updated module descriptions for the first three years of the CMI.

The peers point out that the learning outcomes or a summary thereof should also be anchored in the Diploma Supplement in order to provide graduates with an official short presentation of their respective degree programme to facilitate applying for career opportunities worldwide. The peers notice that a diploma supplement for the CMI label has not

yet been implemented (cf. criterion 5.2) and ask to establish this as soon as possible and to include a description of the qualification objectives.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The degree programme is mainly taught in French, which is reflected in the official name of the study programme "Cursus Master en Ingénierie: Ingénierie et Maintenance des Systèmes pour l'Aéronautique et les Transports."

As the HEI explains, the name IMSAT has been chosen in order to reflect the learning outcomes and the job profiles addressed by the programme, which are focused on aeronautical engineering and product life management activities that serve as the common theme of the four specialties (avionic maintenance engineering, structural maintenance engineering, composite material structure engineering, embedded system engineering).

The programme managers further point out that "CMI" is the name of a specific national model for an engineering training course at a university, irrespective of the field of engineering. A CMI is based on a five-year curriculum (Bachelor plus Master degree) and the programme is evaluated and accredited by the Figure network. It is characterized by a balance between the disciplinary studies and soft skills, the support of high-level research laboratories and involvement of researchers throughout the curriculum, mandatory projects internships in industry and research laboratories, as well as at least one period of international mobility.

If students fulfil all requirements set by Figure, they are awarded the CMI label in addition to the national bachelor's and master's degrees. For the CMI IMSAT, students receive a Bachelor i.e. Licence mention Sciences pour l'ingénieur parcours IMSAT (Bachelor of Science for Engineers, IMSAT pathway) and a Master in Maintenace Aéronautique (Aeronautical Maintenance).

The peers conclude that degree programme's name reflects the intended aims and learning outcomes as well as the main course language.

Criterion 1.3 Curriculum

Evidence:

- Objective- module-matrices for the CMI programme

- Study plan for the CMI programme
- Module descriptions for the CMI programme
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The peers review the curriculum of the CMI IMSAT in order to identify whether the available modules are able to achieve the described qualification objectives. They take into consideration the study plan, objective-module-matrices, and the individual module descriptions.

As the university explains in the self-assessment report, a "CMI (Master degree in engineering) is a selective curriculum characterized by:

- continuity and coherence over five years, built on reinforced bachelor's and master's curricula;
- a balance between the disciplinary base and specialization, on the one hand, and the fundamental disciplines, scientific complements and social, economic and cultural openness (SECO), on the other hand;
- a co-responsibility by research laboratories of international level whose researchers participate in the training throughout the curriculum;
- a pedagogy of experience involving numerous situation-setting activities, internships in laboratories and companies and at least one period of international mobility."

CMI programmes are based on consecutive Bachelor and Master programmes and share teaching units with these programmes. The CMI curricula usually include more mandatory internships and possibilities for mobility. Due to the additional classes, mainly in the field of SECO (personal development, project management and economics), CMI students study 36 ECTS per semester. Students have to "validate" each CMI year, i.e. pass the regular as well as the CMI modules, in order to obtain the CMI. The non-validation of a CMI year does not prevent the possibility of validating the year of the study programme on which the CMI is based. This means that students could obtain the Bachelor and Master degree even if they fail to obtain the CMI label.

At the University of Bordeaux, the CMI IMSAT is partially based on the curriculum of the Bachelor's degree programme *Sciences pour l'ingénieur parcours IMSAT* (Bachelor of Science for Engineers, IMSAT pathway) and the Master's degree programme *Maintenance Aéronautique* (Aeronautical Maintenance). In addition to these classes, students have to

take six additional ECTS-credits per semester in the field of “social, economic and cultural openness”. These are intended to enable the students to “develop autonomy, cooperative behaviour and understanding of the environments necessary for professional life”.

The curriculum is structured as follows (for a more detailed overview see annex): Students follow a common curriculum for the first two years (CMI 1-2) at the campus in Talence, where they acquire the necessary foundation of mathematics, physics/chemistry, computer science, mechanical and electrical engineering. Introductory courses in humanities, engineering sciences and the field of aeronautics and transport complete the first two years. The last three years (CMI 3-5) take place at the Evering Institute in Mérignac.

The third year reinforces the students’ knowledge in mechanical and electrical engineering and contains several electives that allow students to gain an insight into the specialisations of the Master’s degree programme. Students can choose among four specialisations offered in the underlying Master’s programme: avionic maintenance engineering (MAA), structural maintenance engineering (MAS), composite material structure engineering (SC) and embedded system engineering (SEE). Based on their specialisation, students thus follow different mandatory and elective courses in their final two years of the CMI.

Apart from these subject-related courses, the curriculum encompasses the additional SECO classes, as well as the four mandatory internships in the industry and/or research laboratories as well as engineering projects (from CMI2 onwards). Regular English classes prepare the students for international mobility and the TOEIC certification (English language skills) at the end of their studies.

During the on-site visit, the peers discuss the English skills of the students as not all students receive a CMI label due to failing the English qualification (see also criterion 2.1). Students, alumni and industry partners identify this as a weak point, especially regarding the students’ level of technical English. The peers suggest increasing the number of technical courses taught in English and encouraging the students to prepare their papers and presentations in English. The programme manager explain that they already implemented some changes regarding this issue (see criterion 2.1). Around 24 ECTS of modules, mostly at master level, are already offered in English. In preparation of the double degree with the University of Cincinnati, the programme managers are currently preparing to offer a full semester of classes in English, as well as an English study group and academic support in English, which will be open to the French students as well. The peers understand that the HEI is already aware of this issue and is taking steps to improve the English language skills of the students; nonetheless, they would like to encourage the university to also implement measures addressed at the lower level CMI students and the other Master’s specialisations.

During the discussion with the students, the peers learn that students can choose freely between the four specialisations. In regular meetings at the beginning of each year, the programme managers and teachers inform the students about the different specialisations and content of studies and the third year allows students to gain insight into their chosen specialisation. While it is possible to change specialisations after the third year, students usually discover their preferences throughout the first two years and confirm their choice after the third year. The peers note that the students seem very well-informed about the curriculum and the choices available to them.

The peers note that the study plan is not yet published on the university website. However, students are informed about the curriculum during regular meetings at the beginning of each year as well as through the module descriptions and programme information on the university website.

From the self-assessment report and the discussions during the onsite visit, the peers gather that the stakeholders, notably students and industry partners, are included in the development of the curriculum and adjustments are made based on their feedback (see criterion 6). From the discussions, the peers observe that students, alumni and industry partners are very satisfied with the curriculum and that there exists a high level of identification on the part of the students and alumni. Students usually find their first job through their final internships, with employers keeping employing them further after they have graduated. Employers value that the CMI IMSAT students have acquired a global view of aeronautics and are thus able to adapt quickly to different departments within a company.

The peers assess that the curriculum, detailed in the annex of this accreditation report, is well-founded and thus prepares the students adequately for national and international occupations. It also allows the students to reach the intended learning outcomes and to obtain the CMI label. The mandatory projects, internships and mobility opportunities, as well as the master specialisations allow the students to build individual profiles. The peers are especially impressed by the integrated internships, which allow students to gain experience in both industry and research. Graduates have great opportunities in the industry but are also well-prepared for a PhD, which they can attain in cooperation with the industry. The peers also note the strong support of the programme by the teaching staff and the participating laboratories (criterion 4), which in their opinion is one of the main contributing factors to the success of the CMI.

Criterion 1.4 Admission requirements

Evidence:

- Admission process

- Admission requirements
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
From the information provided and the audit discussions, the peers understand that admission to the CMI is based on the academic profile of high-school students (grades in maths, physics, chemistry, English) motivational letter, the relevance of the training project and the opinion of the high school class council) and a 20-minute interview with two teachers. Part of the interview process is a test in mathematics and a visit of the facilities on-site.

Candidates apply via the national platform “Parcoursup”; selected candidates are invited to the interview. Foreign students are treated on a case-by-case basis and the interview is conducted by videoconference. The interview is used to assess the motivation of the students and to ensure they understand the expectations and the specificities of the CMI programme. The admission requirements are clearly detailed on ParcourSup, the French platform for university applications as well as the university website. On average, around 60 students are admitted to the CMI per year.

Admissions to the CMI at the beginning of the second year are subject to the same procedure of assessment based on the student’s file and an interview. Students will hand in transcripts of their previous studies, a CV and letter of motivation. Additionally, Figure regulations allows CMI students to switch between different CMI programmes.

The peers ask if admission to the CMI is possible after the second year of the CMI for non-CMI students. The programme managers explain that students can apply for the underlying Bachelor or Master programme, but not for the CMI as they do not fulfil the CMI requirements (additional ECTS, internships, mobility). The peers understand that other universities admit students holding foreign diplomas and students holding a non-CMI bachelor's degree to their CMI programmes if these students follow a training course consistent with the CMI’s requirements to up the additional classes required by the CMI, thus allowing them to continue their studies at master level (CMI4). They suggest implementing similar structures at Bordeaux and clearly defining regulations for the admission of foreign students and the admission to the programme after the second year of the CMI.

The focus on motivation leads to committed students and the peers notice during the discussions that students and graduates are clearly passionate about the CMI and their chosen field. Overall, the peers judge the admission process to be transparent and adequate for selecting the best students for the degree programme.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 1:

The University of Bordeaux provides a clarification on the offered subject-specific courses in English. For the double degree, there are 24 ECTS of modules offered in English for the international students and French students. Additionally, double degree students will study a full semester (semester 9) at the University of Cincinnati. The HEI also plans to extend this model to other partnerships and double degrees. The peers thank the University for this clarification and appreciate the steps the university takes to improve the English skills of their students. In support of this, they maintain their recommendation to improve the English language capabilities of the CMI students, especially regarding the technical English necessary for aeronautical engineering and management.

For the sake of transparency and continuity, the peers find it necessary that the HEI updates the module descriptions for the first three years of the CMI so that all modules of the CMI reference the CMI learning objectives (see also criterion 5.1). They also maintain the recommendation to clearly define regulations for admission of foreign students and admission to the programme after the second year of the CMI.

Overall, the peers regard this criterion as mostly fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Study plan for the degree programme
- Module descriptions for the degree programme
- Information about double degrees and mobility partnerships
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:

Modularization

The degree programme is divided into modules, which comprise a sum of teaching and learning units. Modules usually consist of a combination of lectures, tutorials, discussion

sessions, practical work (lab work, workshops), projects and/or internships. The learning/teaching methodology as well as the learning objectives are detailed in the module descriptions. The peers judge the structure of the modules to be adequate and fitting. The contribution of each module in reaching the qualification level and the overall intended learning outcomes is explained clearly and comprehensively.

All internships are integrated into the curriculum and, through the obligatory report and defence, the HEI also monitors the quality of the internships in terms of relevance, content and structure.

Although CMI students follow a common study plan including projects and internships, they can freely choose one of the four specialties for their master's programme and within their chosen specialisation, different electives are offered. The choice of specialisation and their distinct modules, as well as the choice of where to apply for internships and international mobility allows for an individual study pathway.

During the on-site visit, the peers inquire what would happen if there were changes in the modules of the underlying Bachelor's and Master's degree. The programme managers explain that this is only a theoretical question as a joint team is responsible for all programmes offered at the Evering Institute and the same teaching staff is involved in all programmes. Developments in any of the curricula are thus discussed among the staff and decided jointly. Major changes need to be approved by the faculty council.

Additionally, students have the possibility to follow the CMI while also conducting an apprenticeship in the industry ("formation en alternance"). After successfully completing the first two years, students can apply for an apprenticeship at a French company. The contract is either for one, two or three years and ends upon graduation. Starting from the third year, the curriculum is set up with a rhythm of three months at the university and three months in the industry or laboratories (internships and projects). This allows the apprenticed students to follow the same courses and exams as the regular students. The apprenticeship includes a contract with the employer and remuneration. The regional government subsidizes apprenticeships and the industry partners give part of that financial grant to the university. The peers understand that the workload for apprenticeship students is similar to the workload for regular students.

The peers ask how the apprenticeship students are exposed to research if they complete their internships in the industry. The programme managers assure the peers that the students follow the same modules regarding academic work as the regular students and that during the first two years, the research topics of the staff is presented. If students think about applying for apprenticeships, it is strongly recommended that they complete their internship at the end of the second year in the laboratories. The project modules can also

be done in cooperation with a research lab and thus offer another possibility to come into contact with academic research.

All apprenticeship students are assigned a teaching supervisor that keeps in contact with them. The supervision includes at least four meetings per year, both at the company and on campus. Similar to a learning agreement for mobility, the “Livret d’apprentissage” (apprenticeship booklet) contains the grades, topics for internships and other necessary information regarding the apprenticeship. The peers ask the university to provide an example of such an apprenticeship booklet after the on-site visit, but overall see the apprenticeship as a great opportunity for the students to gain practical experience in the industry.

With the self-assessment report, the HEI also submits statistical data that show the low dropout rates and high graduation rates. Overall, the peers conclude that the curriculum is structured in a way that allows students to complete the degree without exceeding the regular course duration (see also criterion 3).

International Mobility

Though Figure requires international mobility in order to award the CMI label, the curriculum does not include a mandatory mobility window. Instead, students can chose to spend a semester abroad at a partner university or conduct an internship in a foreign country. They also have the opportunity to take a gap year and work as an “international volunteer” in a company abroad (Volontariat international en entreprise, VIE). If they prefer, students can go abroad more than once.

Regarding academic mobility, two specific partnerships exist for the CMI programme: an exchange programme with the École Nationale d’Aérotechnique of Montreal and a double degree with the University of Cincinnati. Each year, six CMI students can spend their fourth semester in Montreal and both universities work together in projects involving students and equipment in both countries.

The double degree with the University of Cincinnati is currently being established and scheduled to start in September 2021. Around six CMI students per year would complete part of their master’s modules in English in Bordeaux together with the American students and then spend a semester in Cincinnati. Upon graduation, the students would receive a Master of Engineering from the University of Cincinnati and the Master diploma from the University of Bordeaux.

Through the contacts of the Figure network, students can apply for a laboratory internship at one of the Big Ten Academic Alliance universities in the US.

In regular meetings, students are informed about the possible destinations and mobility windows, as well as the application and recognition procedures. Students from higher years share their experience regarding mobility and possible courses to study. All presentations are accessible via Moodle after the meeting. If students think about applying for apprenticeships, it is strongly recommended that they complete their mobility at the beginning of their studies and before they sign the apprenticeship contract. CMI students can apply for scholarships by the French government or the region, Erasmus+ grant or the excellence fund by the University of Bordeaux.

From the self-assessment report and the discussions during the on-site visit, the peers understand that there is a designated contact person who coordinates international mobility and that there are rules for recognising achievements and competences acquired outside the higher education institution. The partner universities of the Evering Institute and the University of Bordeaux, the contacts established by the Figure network and the research contacts from the teaching staff offer many opportunities to go abroad. There are also cooperation agreements for internships. Before each mobility (studying or internship), a learning agreement is established.

Statistical data show that students usually go abroad during their second year to the partner university in Montreal and during the fourth year through ERASMUS and international internships. As international mobility previously was not required for the CMI label, mobility rates have been low. A high percentage of students also apply for apprenticeships, which hinder mobility further as apprenticeships are limited to French companies and not all companies have foreign branches or send their apprentices abroad. The HEI is currently trying to increase mobility rates and has implemented several measures. They increased the communication regarding the mobility requirement of the CMI and the mobility options (partner universities, ERASMUS, Figure network), established the double degree with the University of Cincinnati and implemented the possibility for apprenticeship students to suspend their contract during their mobility period. The peers are satisfied that the HEI is aware of this issue and has taken steps to increase student mobility. As the outcome of these measures will only become apparent over the long-term, they encourage the university to follow up on the measures and to take further action if necessary.

Criterion 2.2 Work load and credits

Evidence:

- Study plan for the degree programme
- Module descriptions for the degree programme
- Self-assessment report

- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
All modules of the programme are assigned ECTS credits. One semester comprises 36 credit points with each credit point amounting to 25 working hours that include both attendance-based learning and self-studies. The ratio between attendance-based learning and self-study is detailed in the module descriptions. The module structure corresponds to the standards of the EQF, ASIIN and EUR-ACE®.

Based on the feedback from the students through the course evaluations and personal discussions, the ECTS and workload of individual modules are adapted. For example, the workload of the practical work has been distributed more evenly over the semester.

During the discussions, the peers learn that the students are generally content with their workload and believe the awarded credits to reflect the workload adequately. While the second year is seen as the most difficult in terms of workload, the students find the workload overall well-balanced. They feel also well-informed about the requirements necessary to obtain the CMI-label and the workload associated with the curriculum.

The peers acknowledge that all parts of the curriculum, including the mandatory internships, are awarded credit points, leading to 360 ECTS being awarded for the CMI programme. The rules governing the awarding of credits are accessible via the university website. The peers agree with the students that the workload overall seems feasible and that it is possible to complete the degree within the regular course duration.

Criterion 2.3 Teaching methodology

Evidence:

- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The CMI programme utilizes different educational methods for teaching the courses, such as lectures, application courses, practical works (workshops/ laboratory work), internships, projects and self-study. The teaching methodology is updated each year based on discussions in the IMSAT stakeholder council, the student surveys, available infrastructure (see criterion 4.3), and the pedagogical support service (see criterion 2.4).

The peers are impressed by the practical activities of the students, which also involve practical exercises on real aircrafts (parts) and aircraft systems. Many of the practical exercises

also include group work, for example the module on non-destructive testing where students are separated into two groups to find a solution to test the material. The groups are then split again and interchanged with students explaining the two solutions to each other. In another case, students send their test results to students at the partner university in Cincinnati who analyse the results. The CMI students then continue their work based on that analysis. This simulates part of the engineering work practice, which often includes working in (virtual) teams.

Students are familiarised with academic writing in the modules “Introduction to scientific and aeronautics history and to academic research” and “Scientific Culture, Methodology and communication 1 and 2”. Through the laboratory internships and projects, students are directly involved with academic research. As most of the staff also belongs to one of the research labs that support the CMI, there is a strong connection between research and education.

Overall, the peers acknowledge that within the CMI a variety of teaching methodologies is used that support the students in achieving the intended learning outcomes through both attendance-based learning and self-study. Students are consistently familiarised with academic research and writing.

Criterion 2.4 Support and assistance

Evidence:

- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
During the on-site discussions with the programme coordinators, the teachers and especially the students, the peers gather a comprehensive impression of the offers related to supporting and assisting the students.

The University of Bordeaux offers financial aid, health services, career guidance as well as language and sport courses. Students also benefit from an active student life and the international partnerships established by the university. As noted in 2.1, students can apply for mobility grants from different sources and there are several national sources for financial aid. The Evering Institute also offers six scholarships for second-year internships in research laboratories.

Regarding pedagogical support, there is a designated staff member responsible for each CMI year, who carries out individual follow-ups with the students. These meetings happen systematically during the first year, if necessary after the examination boards in second and

third year and based-on-demand in the last two years. During these meetings, students can ask questions regarding the specialisations, mobility, internships and other curricular matters. CMI students also benefit from individual follow-ups by a tutor during internships and apprenticeships (with on-site company or laboratory visits). There is an active mentoring and support system through the IMSAT student association or the inter-CMI association of the university. From the discussion with the students, the peers note that the CMI association also organizes an integration weekend for first-year students as well as several student-alumni/industry events for networking purposes and internship opportunities.

Due to the small group size, students of the same year ("promotion") know each other and through the different events get to know other years as well. The students are thus well connected and, as the peers learn, very active in promoting the CMI programme, e.g organising events and answering questions regarding previous mobility and internships. The university is currently recruiting a dedicated staff member to support the students in their search for internships regarding administrative and financial matters and the Evering Institute maintains a list of open internship and apprenticeship opportunities. The students confirm that they are very satisfied with the support and assistance they receive and that they can contact their professors at any time if problems occur.

The Figure Network has created an "internship search kit" for CMI students, which includes a presentation of the CMI to facilitate its understanding. It also established an online career center to connect, for example, students and companies. The students confirm that they usually do not have any difficulties finding internships or a job after graduation.

As one of the research laboratories is based in a different location, the peers ask the students if this affects their studies. The students explain that theoretical aspects are usually taught at the campus in Talence, the practical aspects in Merignac at the Evering Institute near the Airport of Bordeaux. The curriculum is structured to minimize commuting, with the first year mainly in Talence and the later years based mainly in Merignac. The students feel that although the Merignac campus is not that easy to reach, the commute is nevertheless feasible and as the schedule is well-organized, it does not impact their studies negatively.

Overall, the peers are very satisfied with the support and assistance the students receive.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 2:

The HEI submits examples of "Livret d'apprentissage" (apprenticeship booklets) that guide the follow-up of the apprenticeship. This file is completed over the course of the apprenticeship and contains the description of the job, the objectives for the each company period

within the apprenticeship (discussed with the supervisor), the supervisor's report on the apprenticeship, the evaluation of the apprentice work by the company supervisor on different criteria, the student's grades, and reports of supervisory meetings for each scholar period.

The peers thank the University for the additional information and the booklet examples. In their opinion, the apprenticeship folders and the supervisory follow-up ensures that the apprenticeship students work at the level aimed for and on tasks that are relevant to the study programme during their company periods. The peers underline that they find the apprenticeships to be are great opportunity for the students to gain practical experience in the industry.

The peers regard criterion 2 as fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Official documents outlining the examination process
- Exams calendar
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The peers analyse the provided documents and notice that all modules of the CMI programme are examined. Examination types include written exams, time-limited lab exams (practical exercises), continuous controls, quizzes, work reports, report and defence of projects and internships, oral presentations, poster presentations, other models of evaluations e.g. for team work exercises and projects. The module descriptions mention the form of the exams and the weighting of the individual parts; evaluation modalities are communicated to students at the beginning of the semester. All relevant rules and regulations regarding the exam procedures are anchored and published on the university website. There are also university guidelines and support services for handicapped students.

The academic calendar including the examination period of the academic year is communicated in September. Students are informed about exam dates at least two weeks before

the exam and there is usually a revision week before the examination period and a minimum of two free weeks before re-sits. The deadline for reports and dates of oral presentations are usually before the exams.

As is common in France, the CMI uses a system of continuous monitoring (tests and midterms during the semester) and a final examination at the end of each semester. Learning agreements cover externally acquired credits. All internships finish with a report and defence and are assessed by at least one academic supervisor. Students have access to the grading criteria for the internship via Moodle. The internship defence session of the report includes a self-assessment by the student about the skills they acquired during the internship or a problem they encountered, how they dealt with it and how they would adapt their approach in the future. While not typically part of academic work, the peers agree with the programme managers that this teaches the students to evaluate themselves and makes them aware of the soft skills they acquired.

In order to pass a module, students must obtain an overall average score of at least 10/20 points according to the French grading system. This takes into account the continuous assessment and the final exam of all courses/workshops in a module. Students with a lower score have to repeat some exams with the module descriptions detailing what exams exactly. Re-sits (second session) usually take place about a month after the original exam. Other classes can compensate a failing grade, if the overall average in the different components of the curriculum (fundamentals, scientific courses, SECO, ..) is at least 10/20. The first year only includes modules with continuous assessment and there are no second exam sessions. Students are allowed to validate the year despite failing some modules if the overall average is at least 10/20. The year supervisor for CMI1 points out potential difficulties early in the individual follow-up with the students.

Based on the student statistics and discussion with the students, the peers are convinced that it is possible to complete studies on time. The students feel well-informed and that the amount of exams is manageable. They see the continuous assessment as a way to get feedback and a form of exam preparation. After each presentation of an internship or project, students receive feedback on their report and presentation. Teachers also provide feedback on exams if the students ask for it.

The peers also inspect a sample of exams, internship reports and project works and are overall satisfied with the general quality of the samples. The focus on practical application within the curriculum is also reflected in the types of exams chosen, which allows assessing the defined learning outcomes of the CMI.

During the discussions, the peers ask whether students have to prepare a Master thesis. The programme managers point out that the mandatory internship in the last Master semester (6 months; projet fin d'etude) includes a report and defense session. Successful validation of that module is required to obtain the master's degree. Students can choose an internship in the industry or a research laboratory. At the start of the internship, the student proposes a topic for the report, which has to be approved by the academic supervisor. The academic supervisor checks if the topic is compliant with the rules and expectations for the internship and after the approval, students prepare the thesis during and after the six month of the internship. They then defend the thesis in front of a committee, which consists of the academic supervisor, the internship supervisor from either industry or the research lab and additional teaching staff. The peers conclude from the discussions and the exemplary theses they assessed during the on-site visit that the final internship and the reports fulfil the ASIIN criteria for a final project. However, the two theses presented seem quite descriptive to the peers. They thus ask for a bigger variety of final internship reports as well as the detailed definition of the internship objectives in order to assess whether the final internship reports correspond to level 7 of the European Qualification Framework (EQF).

The peers also ask what would happen if students do not fulfil the requirements for the CMI label, i.e. validated bachelor's and master's degree, additional ECTS, mobility and internships, English certification. The programme managers explain that if a student would not meet the requirements, they would not be awarded the CMI label. For this, there is no possibility of a re-sit. From the statistics provided with the SAR, the peers see that only about 50% of the students obtain the CMI. The programme managers explain that this is mainly due to the students' difficulties in obtaining the English level certification (TOEIC) and a lack of outgoing mobility (see also criterion 1.3 and 2.1). The HEI has implemented several measures to counter this. For example, the preparation for the TOEIC and the examination has been moved to CMI4, which gives the students a second chance at passing the exam in CMI5. According to the university, students now receive their TOEIC and the issue of English certification thus seems to be solved. Regarding the mobility, the HEI has increased the communication about mobility options, has established a double degree allowing master students to study abroad and implemented the option for apprentice students to suspend their contract during the mobility period. The peers appreciate the efforts of the HEI. As the outcome of these measures will only become apparent over the long-term, they encourage the university to follow-up on the measures and to take further action if necessary.

The students are informed about the CMI requirements via the university and Figure websites as well as informational sessions at the beginning of the each year. Overall, the peers

are satisfied that the HEI has removed any structural obstacles for obtaining the CMI label and that the students are aware of the CMI requirements.

Overall, the peers find that the system, conception and organization of examinations employed in the CMI is efficient.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 3:

With their statement, the University submits additional final internship reports as well as the forms documenting the objectives for the final internship.

The HEI also clarifies the process of validating the contents and objectives of the internships. Before signing the internship agreement and beginning their internship, students have to fill out an "application file" and give the following information: internship topic, subject of internship, educational plan - goals and ends of the internship, position and tasks/ activities assigned to the intern, skills to be acquired / developed during the internship. Their academic supervisor (Bachelor: year supervisor, Master: specialty supervisor) reviews this information and requests additional information if necessary. The supervisor particularly focuses on the relationship between the subject and the teaching pathway, on a scientific / technological level with respect to the current year of the student and on the management aspects for last-years subjects if applicable. Based on this review, the supervisor gives agreement or not to the subject by signing the document. If the supervisor does not agree with the subject, the internship will not be credited.

In the case of apprenticeship, the pedagogical staff dedicated to apprenticeships reviews the file and if necessary, discusses the objectives with the company in order to adapt the subject (and evolution of the subject in case of 2-year-contracts) based on the same requirements as for internships.

During the first week of the internship, the industry or lab supervisor has to fill out a file with detailed objectives of the internship. The academic supervisor then checks the student's progress compared to these objectives during the on-site visit through a discussion with the student and the company/lab supervisor. The objectives are presented both in the final report and during the oral presentation and their clear presentation is a key element for evaluation. In final internships, the capability to propose innovative solutions to encountered issues is part of the learning objectives. This element is evaluated in the report and in the oral presentation, but also through the feedback given by the company/lab supervisor in the student's assessment sheet.

The peers thank the University for the explanation and the additional thesis examples. The defined process for internship validations allows the HEI to ensure that the students work at the level aimed for and on tasks that are relevant to the study programme. Based on the submitted final internship reports, the peers conclude that the CMI corresponds to level 7 of the European Qualification Framework.

Overall, the peers regard criterion 3 as fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Handbook of Academic Staff
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
In the self-assessment report, the university presents data about the number and overall qualification of staff for the CMI IMSAT and during the discussion on-site the peers gain a good impression of the quality of the teaching personnel.

In total, the teaching staff is composed of 77 members, most of which are teacher-researchers. The management of the CMI itself is carried by the Evering Institute: 12 teacher-researches and six additional staff members that help find apprenticeships coordinate the follow-up on apprenticeships and internships, support outgoing mobility, coordinate projects, industrial relations and the integration into the workforce as well as support pedagogical innovation. 74 visiting lecturers from the industry, mainly from the aeronautical field, are involved in various courses in the last three years of the CMI. The HEI has defined recruiting measures that ensure the qualification of the visiting lecturers as well as their fit to the curriculum.

As required by Figure for all CMI programmes, the CMI IMSAT at the University of Bordeaux is supported by two research laboratories (see 4.3) pursuing international research. Based on the self-assessment report, the discussions and visitations of the laboratories, the peers conclude that the research activities of the staff support the curriculum very well. It should be noted positively that students are in contact with the research laboratories and the research done by their teacher from early on through the projects and internships (see 1.3).

During the discussions, the peers learn that there are currently no retirements or changes foreseen during the accreditation period. The HEI management assures that it has no plans to decrease the amount of professorships and that there are enough grants available to fund the current staff. The long-term strategy of the University of Bordeaux also includes the “Initiative of Excellence”, which allows funding for additional positions especially in innovative fields. In the past year, two new professors in the field of avionics and mechanical engineering respectively have been recruited and it is expected that additional staff members will be recruited for the Evering Institute. In the discussions, the peers notice that the staff members, especially the core faculty, are very motivated and convinced of the offered study programme. The peers are also impressed by how well the industry lecturers are integrated into the teaching staff and by the involvement of industry stakeholders with regard to the development of the curriculum.

The peers conclude that the teaching staff is well qualified and quantitatively sufficient in order to sustain the programme under review.

Criterion 4.2 Staff development

Evidence:

- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The peers understand from the self-assessment report and the audit discussions that staff can use several services for the development of their pedagogical and professional skill.

The University of Bordeaux has established a board for staff development (direction de la stratégie et développement des ressources humaines) which also includes a department on skill development (service du développement des compétences). This department is responsible for the design, management and implementation of the training plan for teaching, administrative and technical staff in accordance with the strategic directions of the university. Each year, several courses are offered, for example teaching classes in English, sciences games, using moodle, hybrid education, and staff members are informed via e-mail and an intranet webpage. Staff members from the Evering Institute including the industry lecturers also benefit from a staff member dedicated to support innovative pedagogy (Mission d’appui à la pédagogie et à l’innovation - MAPI) for their didactical training. The Bordeaux inter-CMI association allows CMI teachers to share their experiences and pedagogical innovations. Additionally, the staff can participate in the training courses by the Figure Network, e.g. for active pedagogy. Since 2019, staff members can apply for an educational project leave to develop and improve their pedagogical practices.

New staff members benefit from an on-boarding process, which includes practical information on the University and everyday activities, and reduced teaching hour obligation for their first year.

The University of Bordeaux also encourages the development of international programmes and offers support for setting up international academic programs, courses or teaching units, training courses for the international classroom, English conversation workshops sessions and weekly sessions to test out a course in English. In order to set up the double degree with the University of Cincinnati, several staff members made use of that service.

Regarding professional development, the Evering Institute finances courses for aeronautical teaching certificate for its staff members, circa five weeks of training for the teaching and technical staff each year, visits by international colleagues as well as training of the technical staff, e.g. electrical and security certifications. Staff members, management teams or feedback from student surveys can give the impetus for deciding on what training will be offered and financed.

The peers note that there are many offers for developing the staff's pedagogical skills. However, during the discussion with the teachers the peers understand that pedagogical training is not mandatory and that not all staff members use these services. Some choose self-study or offers from external companies. The peers suggest improving the rate of usage and implementing a systematic training of the teaching staff regarding their pedagogical skills and the teaching tools and means available at the university.

The peers inquire if teachers can apply for a sabbatical and if staff can benefit from international mobility. They learn that sabbaticals are generally possible but due to the workload not many people apply for one. In the past few years, one professor went to the partner university in Montreal for one year, another one to Vietnam. Staff can benefit from an ERASMUS grant for staff mobility, but few go abroad. The peers propose to increase the mobility of staff to encourage students to go abroad as well. For this, the mobility does not have to be long-term, short-term stays such as visiting lectures or projects for a few weeks would be already beneficial.

Overall, the peers are satisfied that there are offers and support mechanisms available for teaching staff who wish to further develop their professional and teaching skills.

Criterion 4.3 Funds and equipment

Evidence:

- Partnership Agreements
- List of laboratories and equipment

- On-site visit
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
During the discussions, the peers learn that the CMI was funded by project money when it was first established. It is now covered by the University of Bordeaux within the Faculty of Science and Technology.

The CMI utilizes resources at two campi of the University of Bordeaux. The first two years are set at the Campus in Talence, where the Faculty of Science and Technology is based. The infrastructure in Talence includes practical work classrooms for electronical engineering and mechanical engineering, as well as classrooms dedicated to projects.

The final three years, students follow courses at the Evering Institute in Mérignac, which is located next to the Airport of Bordeaux. The Evering Institute offers two amphitheatres, 20 classrooms, 15 practical-work classrooms, four computers classrooms with the necessary software, a hangar with four aircraft and an additional commercial aircraft as well as five aircraft simulators. The Institute will be expanded over the next year. In 2021, new classrooms (capable of web conferences/allowing distance learning) and student facilities for sports and associations will be finished. Two years later, the “hangar of the future” is scheduled to open in 2023 and will include 3D scanner, robots, augmented reality and testing equipment. The hangar is intended to combine teaching, research and activities with the industry. The Institute has an annual budget for financing equipment, projects and internship. Staff members can add wishes for equipment and maintenance to an internal list, which is then discussed within the monthly council. The council decides on funding of the projects, internships and equipment.

Students benefit from the university library and have access to the computer rooms for self-study purposes. They can borrow a computer for their studies, which was especially important during the Covid-19 lockdown. The university plans on providing students with access to virtual machines, so that from next semester on they would be able to work with Matlab and other necessary software remotely. During the discussions, both teachers and students show their satisfaction with the available resources. The students especially praise the access to real planes and the hands-on work this permits.

As stated before, the CMI is supported by research laboratories. The two main partners are the Institute of Mechanics and Mechanical Engineering (I2M) and the IMS laboratory (Integration: from Material to Systems). The I2M is involved in research in mechanical engineering, e.g. research on composite material (manufacture, properties during life cycle, non-

destructive control), while the research activities of the IMS are based in electrical engineering, especially modelling, control and fault detection for aerospace systems, and the design and reliability of embedded systems. Students are involved with these laboratories through different courses in the curriculum, the laboratory internships and projects.

Additionally, the Evering Institute and the CMI in particular is supported by strong ties to the surrounding aeronautical industry partners through internships, apprenticeships, student projects, field trips to the company and maintenance sites, and industry lecturers. The industry partners are represented in the development committee (see criterion 6) and include both small and medium-sized companies (suppliers, equipment manufacturers) as well as big companies in the aeronautical field (aircraft manufacturers). The industry partners thus cover all aspects of the aeronautical sector and students gain early insight into possible positions and employers.

During the on-site visit, the peers were able to gain a comprehensive impression of the facilities and laboratories on both campus. They were very impressed with available infrastructure, especially the hangar and the aircrafts, which enable hands-on teaching and learning, allowing students to gain insight into aircrafts and maintenance and to apply their knowledge directly. The close ties to the nearby airport and aeronautical companies add to the practical focus of the curriculum.

Overall, the peers are very satisfied with the infrastructure for the CMI IMSAT.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 4:

The University of Bordeaux does not comment on this criterion.

The peers maintain the recommendations to increase staff mobility and to implement systematic training of the teaching staff regarding tools, means, and pedagogical skills.

The peers regard criterion 4 as fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Module descriptions
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The module descriptions contain all necessary information: the module identification code, person(s) responsible for each module, teaching method(s) and workload, credit points, intended learning outcomes, module content, planned use/applicability, admission and examination requirements, form(s) of assessment and details explaining how the module mark is calculated, recommended literature and the date of last amendments made. Students will also be informed in the first session of a course about the date, form and weighting factor of each exam /continuous assessment (see criterion 3). The module descriptions are available to students and teaching staff via the university website.

The peers are overall very satisfied with the module descriptions. However, the learning outcomes written in the module description for the first three years of the CMI do not correspond to the ones presented in the CMI objective-module-matrix (see criterion 1.1). The peers ask the HEI to provide updated module descriptions for the first three years of the CMI that reference the CMI learning objectives.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Self-assessment report
- Example of a CMI diploma
- Example of a CMI Transcript of Records
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
From the presented documents and the on-site discussions, the peers understand that at graduation every student who fulfils the CMI requirements is awarded a CMI Diploma. The diploma for the Bachelor and Master degree also include a Transcript of Records listing the modules (including the additional CMI modules) and individual grades.

The peers appreciate that the students receive a diploma supplement with their Bachelor's and Master's degrees that shows all teaching units they followed, including the CMI related units. Nevertheless, the peers find it essential that all graduates are provided with a Diploma Supplement in English after their completion of the CMI programme. This Diploma Supplement should contain a concise description of the CMI's learning outcomes, the list of modules and individual module grades of the student, the relative grade of the comparable graduates' cohort as well as information regarding the French system of higher education and the CMI system in particular. Such a Diploma Supplement will increase the na-

tional visibility and international comparability of the graduates and facilitate the employment process as employers receive a complete set of information together with the applicant's CMI label and other degrees.

Criterion 5.3 Relevant rules

Evidence:

- Bachelor degree regulation and Master degree regulation
- Examination Regulations
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
From the documents provided as well as the discussions during the on-site visit, the peers assess that all required rules and regulations are made accessible to students and are published on the university website. The Website of the Figure Network gives information about the CMI structure in general.

The discussion with the students confirms that they feel well-informed about regulations and are comfortable about the access to any information pertaining their degree programme.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 5:

Criterion 5.1 Module descriptions

The HEI does not comment on this aspect. For the sake of transparency and continuity, the peers find it necessary that the HEI updates the module descriptions for the first three years of the CMI so that all modules of the CMI reference the CMI learning objectives.

Criterion 5.2 Diploma and Diploma Supplement

With their statement, the HEI also submits a newly developed diploma supplement that contains the necessary information, especially a concise description of the programme's learning outcomes and information regarding the French system of higher education and the CMI. The university explains that CMI students will receive a French and English version of the diploma supplement in order to increase the national visibility and international comparability of the graduates.

The peers thus regard this criterion as mostly fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Examination Regulation
- Statistics about students
- Questionnaire used for the evaluation of courses
- Results of the evaluation of courses
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
From the documents presented and from the discussions during the on-site visit the peers gain an impression of the quality management procedures that are in place for the CMI IMSAT.

All CMI programmes are subject to the quality assurance system of the Figure network, which has been evaluated and validated by the French accreditation council Hcéres. Figure regularly assesses the CMI programmes offered. For the assessment, the university provides a Self-assessment report (SAR) for the Figure accreditation criteria, which also includes an evaluation if each criterion is achieved, partially achieved or not achieved. The SAR should also include an action plan for criteria not (fully) achieved. The action plan is discussed with the stakeholders (such as students, teachers and programme managers) of the CMI and then assessed by a committee of peers from Figure. The underlying Bachelor and Master programmes, as well as the CMI are subject to national accreditation and their "pedagogical model" is assessed regularly in preparation for the national accreditation. This means that the programme managers of the CMI IMSAT assess their programme at least once every five years and discuss the curriculum, including the learning objective, and intended improvement measures with all stakeholders.

Several additional quality management measures for the CMI have been established. These measures include the IMSAT stakeholders' council and the annual CMI IMSAT development committee, as well as student and teacher surveys each semester. The university also organizes student satisfaction surveys and graduate surveys.

The IMSAT Stakeholder Committee is a joint board for all IMSAT programmes. Representatives from teaching staff and students (one representative per year) discuss the study programme, including the learning objectives, and suggests changes. The Committee meets monthly. The IMSAT Development Council consists of representatives from industry, academia and students and assists in developing the competency profile and curriculum in their yearly meeting. Each year, the council focuses on a different issue, with this year's focus being on improving international mobility.

The students evaluate all modules offered in a semester at the end of the semester. Teachers receive the results of the evaluation, analyse the feedback and discuss it with their colleagues. General issues are discussed in the stakeholder council. The results and the intended measures are explained to the students via a pdf document (summary for each CMI year) at the end of each semester and discussed with the next class at the beginning of the following year. The peers are impressed by the systematically closed feedback loop and see that the CMI students are well-informed about the quality development of the CMI (see also below). It should also be noted that there exists a high response rate of 60-70% to the evaluations. The teachers praise the constructive feedback given by the students.

As modules are offered for several study programmes at once and evaluated by all students, it is not possible to differentiate the feedback based on the different study programmes. The same is true for the survey on student life and the graduate survey, which the university organizes each year. The stakeholder council discusses the aggregated results of the anonymous survey and proposes actions with follow-ups. There are no surveys specific to the CMI yet, though this is planned for the future. During the discussions, the peers observe that there is an active discourse among and between students, teachers, programme managers and industry partners.

Each semester, teachers are able to give their feedback on the CMI through a survey. All staff members are invited to the yearly development committee. The inter-CMI association offers a platform to share experiences or to discuss the CMI and propose joint actions.

Teachers receive feedback from the CMI students in personal discussions, especially during the projects. Results of the course evaluations as well as improvement measures are discussed among teaching staff. The faculty organizes monthly feedback meetings with student representatives from all programmes and for each year. During the on-site discussions, the students and alumni state that their feedback is valued and taken into account, e.g. regarding the distribution of workload or duplication in the curriculum. Alumni can comment on the CMI during the graduate survey or during the meet-ups between current students and alumni, which are organized by the alumni association. A linkedIn group and the CMI association function as an alumni tool.

Industry representatives are closely involved in the CMI, through visiting lectures, events at the university, internships or the yearly development committee. After each internship, the industry supervisor fills out a questionnaire and gives feedback on the profile of the student during the defense of the internship report. This, together with feedback during personal discussions, is then reviewed during the monthly meetings of the stakeholder council.

The peers understand that the communication between the different stakeholders works very well. The monthly stakeholder council and yearly development council meetings show a clear drive to improve the study programme. The peers are especially impressed by the closed loops of the QM system that are implemented in practice. However, the feedback structure and overall Quality Assurance Processes, especially the responsibilities and mechanisms for the purposes of the continued development of the CMI, should be documented. The programme managers explain that the university currently prepares for ISO certification and that all processes, including QM processes, are documented. The peers ask the HEI to provide the documents after the on-site visit.

Overall, the peers find that the established quality management measures are suitable to evaluate and improve the study programme.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 6:

The HEI submits sample documents for the quality management system at the Evering Institute together with their statement.

The statement clarifies that the Evering Institute is currently implementing a quality management system based on the ISO-9001 standard. Due to other priorities such as the launch of the Institute, the internationalisation of a master programme, the start of a new engineering school and the arrival of new staff, the finalisation of this work was postponed. The HEI expect to finish the implementation of the QM system before the end of 2021.

The peers appreciate that the Evering Institute has started to implement a quality management system. As not all processes are documented, especially those regarding the continued development of study programmes, the peers thus maintain that the requirement to define the responsibilities and mechanisms for a continuous development of the study programme in a binding way.

They are nevertheless convinced that the quality management measures of the study programme are well-establihed and suitable. Overall, the peers regard criterion 6 as mostly fulfilled.

D Additional Documents

Before preparing their final assessment, the panel ask that the following missing or unclear information be provided together with the comment of the Higher Education Institution on the previous chapters of this report:

D 1. QM process documentation
D 2. Additional examples of final theses and the detailed definition of the final intern-ship objectives
D 3. Folder for apprentice students

E Comment of the Higher Education Institution (30.07.2020)

The institution provided a detailed statement as well as the following additional documents:

- Additional examples of final theses
- Application and objective files for internships
- Feedback of companies concerning internships
- Folder for apprentice students
- CMI diploma supplement
- Documents regarding the Quality Management System
- Study plan

F Summary: Peer recommendations (09.08.2020)

Taking into account the additional information and the comments given by the University of Bordeaux, the peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
CMI Engineering and Maintenance for Aeronautical and Transport Systems (IMSAT)	With requirements for one year	EUR-ACE®	30.09.2025

Requirements

A 1. (ASIIN 1.3, 5.1) Rewrite the module descriptions so as to include information about the CMI qualification objectives of each module of the first three years.

A 2. (ASIIN 6) Ensure that responsibilities and mechanisms for a continuous development of the study programme are defined and binding.

Recommendations

E 1. (ASIIN 1.3) It is recommended to improve the English language capabilities of the students, especially regarding the technical English necessary for aeronautical engineering and management.

E 2. (ASIIN 1.4) It is recommended to clearly define regulations for admission of foreign students and admission to the programme after the second year of the CMI.

E 3. (ASIIN 4.2) It is recommended to implement systematic training of the teaching staff regarding tools, means, and pedagogical skills.

E 4. (ASIIN 4.2) It is recommended to increase staff mobility.

G Comment of the Technical Committee 01: Mechanical Engineering/Process Engineering (03.09.2020)

The Technical Committee discusses the procedure and follows the assessment of the peers without any changes.

The Technical Committee 01 – Mechanical Engineering/Process Engineering recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
CMI Engineering and Maintenance for Aeronautical and Transport Systems (IMSAT)	With requirements for one year	EUR-ACE®	30.09.2025

Requirements

A 1. (ASIIN 1.3, 5.1) Rewrite the module descriptions so as to include information about the CMI qualification objectives of each module of the first three years.

A 2. (ASIIN 6) Ensure that responsibilities and mechanisms for a continuous development of the study programme are defined and binding.

Recommendations

E 1. (ASIIN 1.3) It is recommended to improve the English language capabilities of the students, especially regarding the technical English necessary for aeronautical engineering and management.

E 2. (ASIIN 1.4) It is recommended to clearly define regulations for admission of foreign students and admission to the programme after the second year of the CMI.

E 3. (ASIIN 4.2) It is recommended to implement systematic training of the teaching staff regarding tools, means, and pedagogical skills.

E 4. (ASIIN 4.2) It is recommended to increase staff mobility.

H Decision of the Accreditation Commission (17.09.2020)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The Accreditation Commission discusses the procedure and follows the assessment of the peers and technical committee without any changes.

Assessment and analysis for the award of the EUR-ACE® Label:

The Accreditation Commission deems that the intended learning outcomes of the degree programme comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 01.

The Accreditation Commission for Degree Programmes decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
CMI Engineering and Maintenance for Aeronautical and Transport Systems (IMSAT)	With requirements for one year	EUR-ACE®	30.09.2025

Requirements

A 1. (ASIIN 1.3, 5.1) Rewrite the module descriptions so as to include information about the CMI qualification objectives of each module of the first three years.

A 2. (ASIIN 6) Ensure that responsibilities and mechanisms for a continuous development of the study programme are defined and binding.

Recommendations

E 1. (ASIIN 1.3) It is recommended to improve the English language capabilities of the students, especially regarding the technical English necessary for aeronautical engineering and management.

E 2. (ASIIN 1.4) It is recommended to clearly define regulations for admission of foreign students and admission to the programme after the second year of the CMI.

E 3. (ASIIN 4.2) It is recommended to implement systematic training of the teaching staff regarding tools, means, and pedagogical skills.

E 4. (ASIIN 4.2) It is recommended to increase staff mobility.

I Fulfilment of Requirements (17.09.2021)

Analysis of the peers and the Technical Committee

For all degree programmes

A 1. (ASIIN 1.3, 5.1) Rewrite the module descriptions so as to include information about the CMI qualification objectives of each module of the first three years.

Initial Treatment	
Peers	Fulfilled Justification: the module description on the web site provides as required all the information about the CMI qualification objectives
TC 01	Fulfilled Vote: unanimous Justification: The Technical Committee discusses the procedure and follows the assessment of the peers without any changes.
AC	fulfilled Vote: unanimous Justification: The Commission follows the assessment of the peers and committees without any changes.

A 2. (ASIIN 6) Ensure that responsibilities and mechanisms for a continuous development of the study programme are defined and binding.

Initial Treatment	
Peers	Fulfilled. Justification: the provided documents describe clearly the responsibilities of each staff member, as well as the procedure for a continuous improvement of the CMI programme.
TC 01	Fulfilled Vote: unanimous Justification: The Technical Committee discusses the procedure and follows the assessment of the peers without any changes.
AC	fulfilled Vote: unanimous

	Justification: The Commission follows the assessment of the peers and committees without any changes.

Decision of the Accreditation Commission (17.09.2021)

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
CMI IMSAT	All requirements fulfilled	EUR-ACE®	30.09.2025

Appendix: Programme Learning Outcomes and Curricula

According to the Self-Asessment Report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the CMI Engineering and Maintenance for Aeronautical and Transport Systems :

Principal generic learning outcomes	**Specific IMSAT learning outcomes**
(01) acquisition of fundamental and disciplinary knowledge necessary for the specialisation and in order to operate in a multidisciplinary context	Modelisation of engineering phenomena and systems, applying fundamental tools of mathematics and physics.
	Expertise in digital and micro-programmed system architecture
	Expertise in embedded operating systems and real time
	Knowledge of the different constituents of composite materials (types of reinforcement structures and polymer, metallic and ceramic materials)
	Structure sizing
	Understanding physical phenomena induced by industrial processes
	Knowledge of composite damage mechanisms and associated models
(02) development of the capacity to select and apply analytical methods and tools , and to critically interpret results	Analysis of experimental or simulated data
	Comprehension of the methods and tools used to modelise and analyse different types of damage on metallic and composite structures
	Composite repair and manipulation of specialised tools for aeronautics
	Design and improvement of maintenance programmes for aircraft and/or associated equipment

(03) the identification, formulation et resolution of real problems whilst taking account of technical and non-technical constraints (security, environment, economic & ethical factors)	Participation in client-support missions for constructors, equipment manufacturers or airline companies
	Comprehension of methods and tools for design and analysis of flight control laws
	Development of local industrial networks
	Development of regulated, controlled and computerised embedded systems
	Development of embedded applications using computer languages
	Establish cohabitation of material and software modules
	Experimentation: prototypes, products and new procedures
	Design of composite structures and multi-materials
	Selection of materials and procedures according to their applications
	Machining of composite materials
(04) development and design of new products at the cutting edge of disciplinary knowledge and technological advances	Successful completion of applied research
	Establishment and certification of repair solutions in the domains of avionics, systems and structures
	Integration of constraints linked to maintenance and maintaining operational effectiveness in the technical and research in accordance with new aircraft programmes
	Design of embedded electronic systems for aeronautics and transports in particular
	Expertise in manufacturing procedures of composite materials
	Running calculations for composite structures
(05) identification, localisation and obtention of data	Design and exploitation of computer data bases

(06) conception and execution of experiments, interpretation and exploitation of experiment results	Knowledge of non-destructive inspection techniques for aeronautics and tools for measurement and testing
	Knowledge of non-destructive inspection techniques and tools for measurement and testing
	Expertise in testing for characterisation of composite materials (mechanical testing, CND, ...)
(07) use of digital tools and realisation of simulations in order to lead studies and research possible solutions	Expertise in design and validation of repair solutions for metallic or composite structures using adapted digital tools
	Design, analysis and implementation of testing methods for avionic equipments and their interconnexions
(08) application of industrial and respect of safety and usage guidelines	Managing the follow-up of aircraft navigability / airworthiness
	Expertise of tools and methods to guarantee the safety and reliability of areonautic and transport systems
	Knowledge and application of current aeronautical regulations
	Guarantee embedded system-specific environmental integration
	Guarantee the reliability and safety of the operation of electronic systems, the testing and supervision of power electronics networks
(09) awareness of economical, organisational and managerial issues	Knowledge of the employment market and ability to situate oneself in the professional context
	Understanding questions of economic intelligence, defence and national security, and the international dimension of challenges and economic issues in this domain
	Ability to understand the individual's role and mission within the framework of an organisation in order to adapt and take initiatives
	Understanding of the basics of company management (legislation, marketing and management techniques)

	Management / Anticipation of electronic embedded system life cycles and re-conception of (all or part of) such a product
	Understanding eco-design methods and composite material recycling methods
	Understanding product life cycle management using Product Lifecyle Management (PLM) tools
(10) management of projects and professional and technical activities	Application of basic project management techniques
	Programming and supervision of aeronautical maintenance work
(11) integration of professional and technical knowledge to enable informed judgement and decision-making	Understanding avionic and structure problems for the space field
	Optimisation of energy management and power modules
(12) use of various methods for clear, unambiguous communication	Communication of results (written and oral) using appropriate office technology and tools
	Mastery of employment research techniques (CV and cover letter; interview techniques, presentation of self in different professional situations, promotion of one's skills and experience (written & oral)).
	Ability to work in a team and use technological tools for communicating and working collaboratively
	Mastery of aeronautical technical documentation and ability to create new documentary material using appropriate digital tools
(13) operation in an international, individual or team context	Operational level of written and oral English
	Team management in the context of a project
	Ability to work in a team, to work autonomously, and to take responsibilities to contribute to a project

(14) life-long training	Ability to create one's own professional and personal project, and knowledge of employment research techniques
	Establishment of one's portfolio of professional experience or one's e-porfolio, knowledge of how to write a CV and cover letters ; interview preparation, presentation of self in different professional situations, promotion of one's skills and experience (written & oral).

The following **curriculum** is presented:

Specialties		
French acronym	Name of specialty in French	English name of specialty
IMAA	Ingénierie Maintenance Aéronautique Avionique	Avionic maintenance engineering
IMAS	Ingénierie Maintenance Aéronautique Structure	Structural maintenance engineering
ISC	Ingénierie Structures Composites	Composite material structure engineering
ISE	Ingénierie Systèmes Embarqués	Embedded system engineering

Year	Semester	Name	Specialty	ECTS
1st year	S1	Introduction to scientific and aeronautics history and to academic research	All	3
		English Semester 1 MISIPCG	All	2
		Computer skills and digital culture	All	2
		Notions of physics	All	3
		Introduction to chemistry : from the atom to matter	All	3
		Computer Science	All	3
		Physics and Engineering	All	6
		Engineering Sciences - an introduction	All	3
		Scientific Culture, Methodology et communication MISIPC	All	2
	S2	Electronics	All	9
		Mechanical Systems at equilivrium	All	9
		Professional Skills 1	All	1
		Scientific Culture, Methodology et communication MISIPC (S2)	All	2
		Mathematics and representation of physical phenomena	All	6
		Improvisation and communication (IMSAT & IGEOC)	All	3
		Certificate: Initiation in aeronautics	All	3
		English semester 2 (non SDV) Semester in Autonomy	All	3

2nd year	S3	Technical Communication and Project Work	All	6
		Engineering Sciences	All	9
		Digital electronics	All	3
		Structures 1	All	3
		English semester 3	All	2
		Professional Skills 2	All	1
		Mathematics and Computer Science for Engineering	All	9
	S4	Analogical electronics and internship	All	6
		English semester 4	All	3
		Materials et Fluid Mechanics	All	6
		CAD Project et Solid Dynamics	All	6
		Digital computer analysis	All	6
		Mathematics and engineering	All	6
		Letters and Communication, Culture, expression & creativity - S4	All	3
3rd year	S5	Materials and structures	All	6
		Reinforcement of basics - engineering	All	9
		Analogical systems	All	6
		English and Professional Skills	All	3
		Aeronautical Systems and Maintenance	All	6
		Composite materials and corrosion	IMAA, IMAS, ISC	6
		Conversion of electrical energy	ISE	6
	S6	Structures and vibrations	All	6
		Power electronics	All	6
		Project work, internship and English	All	6
		Hydraulics and flight mechanics	All	6
		embedded computer systems on microcontrollers	ISE	6
		Avionic systems	IMAA, IMAS	6

		Analogical electronics	ISE, IMAA	6
		Thermodynamics and integrated air system	IMAS, ISC	6
		Manufacturing Processes of composite materials	ISC	6
4th year	S7	Quality reliability SdF, SLI	All	6
		Automatic control / Signal processing for aeronautics	IMAA, IMAS	6
		Aeronautical regulations. Technical documentation, Maintenance exploitation	IMAA, IMAS	6
		Non destructive inspection / Life Cycle Conception & Design	All	6
		Management Techniques of companies and organisations 1	All	3
		Composite materials	IMAA, IMAS, ISC	3
		Propelling systems	IMAA, IMAS	3
		Project Management	All	3
		Large multi-technological systems / Fiber and polymers	ISC	6
		Mechanical engineering	ISC	9
		Digital electronics	ISE	6
		Microprogrammed systems	ISE	6
		Architecture et implementation of digital systems	ISE	6
	S8	Professional English	All	3
		Project work/internship	All	3
		Project work or Internship 2	All	3
		Inspection & Trials	All	3
		Management Techniques of companies and organisations 2	All	3
		Automatic control / diagnosis of malfunction	IMAA	6
		embedded systems / radiocommunication	IMAA	6
		Display system / Avionic test	IMAA	9
		Calculation: structural finite elements	IMAS, ISC	6
		Composite mechanics/ repairs	IMAS, ISC	6
		Assembly / Damage / Vibrations	IMAS	9

		Manufacturing Technology and Production	ISC	6
		Procedures and implementation of composite materials	ISC	3
		network protocoles	ISE	6
		Energy conversion systems	ISE	6
		System electronics	ISE	3
		C/C+ Languages + operating systems	ISE	6
5th year	S9	Logistics et regulations for aeronautical maintenance	IMAA, IMAS	12
		Automatics for aeronautical maintenance	IMAA	12
		Embedded electronics and informatics	IMAA	6
		Display systems / Guidance Navigation and Control for astronautics	IMAA	6
		Resistance et structure dynamics	IMAS	12
		structure modification et repair	IMAS	6
		Documentation et prototyping/Structures for astronautics	IMAS	6
		Elaboration procedures, Eco-conception et recycling of composite materials	ISC	9
		Conception and dimensioning of composite and multi-material structures	ISC	9
		Composite characterisation and damage	ISC	9
		Machining et finalisation of aeronautical materials	ISC	6
		Choice of materials MA	ISC	3
		Object-oriented programming and design	ISE	9
		Industrial networks and supervision	ISE	6
		Conception of digital systems	ISE	6
		Architecture of microprogrammed systems	ISE	6
		embedded operating systems and real time	ISE	9
	S10	English and Industrial Environments	All	6
		Project work/Internship	All	24
		Drone systems and non-destructive inspection for aerospatial domains	IMAA, IMAS	6
		Composite structure calculations	ISC	6

		Circuit technology	ISE	6