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CENTRE FOR QUALITY ASSESSMENT IN HIGHER EDUCATION

EVALUATION REPORT

STUDY FIELD of AERONAUTICAL ENGINEERING

at Kaunas University of Technology

Expert panel:

1. **Prof. Dr. David Kennedy (panel chairperson),** *academic;*
2. **Prof. Dr. Giovanni B. Palmerini,** *academic;*
3. **Lect. Dr. Bassam Rakhshani,** *academic;*
4. **Lt Col Andrius Stuknys,** *representative of social partners;*
5. **Mr. Ramil Ahmadov,** *students' representative.*

Evaluation coordinator – *Dr. Domantas Markevičius*

Report language – English

Vilnius
2023

Study Field Data

Title of the study programme	***Aviation Engineering***	***Aeronautical Engineering***
State code	6121EX024	6211EX024
Type of studies	University Studies Bachelor	University Studies Master
Cycle of studies	First	Second
Mode of study and duration (in years)	Full-time (4 years)	Full-time (2 years)
Credit volume	240	120
Qualification degree and (or) professional qualification	Bachelor of Engineering Science	Master of Engineering Science
Language of instruction	Lithuanian, English	Lithuanian, English
Minimum education required	High school certificate: mathematics (0,4); Chemistry or Physics or Biology or Information Technologies or Geography (0,4); English language (0,2)	University bachelor degree certificate (Engineering, Technology, Mathematics, Informatics or Physical Sciences study field degree; and ≥15 ECTS completed in the Aeronautical Engineering, Electronics engineering, Electrics engineering or Mechanical engineering study field subjects.): Average grade (CGPA) of University Bachelor's degree (min. length – 180 ECTS) and its supplement (0,7); Research activities (0,2); Motivation letter and online interview (0,1)
Registration date of the study programme	June 14, 2011	April 4, 2016

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I. INTRODUCTION

1.1. BACKGROUND OF THE EVALUATION PROCESS

The evaluation of study fields is based on the Methodology of External Evaluation of Study Fields approved by the Director of the Centre for Quality Assessment in Higher Education (hereafter – SKVC) 31 December 2019 Order No. V-149.

The evaluation is intended to help higher education institutions to constantly improve their study process and to inform the public about the quality of studies.

The evaluation process consists of the main following stages: *1) self-evaluation and self-evaluation report (SER) prepared by Higher Education Institution (HEI); 2) site visit of the expert panel to the HEI; 3) production of the external evaluation report (EER) by the expert panel and its publication; 4) follow-up activities.*

On the basis of this external evaluation report of the study field SKVC takes a decision to accredit study field either for 7 years or for 3 years. If the field evaluation is negative then the study field is not accredited.

The study field and cycle are **accredited for 7 years** if all evaluation areas are evaluated as exceptional (5 points), very good (4 points) or good (3 points).

The study field and cycle are **accredited for 3 years** if one of the evaluation areas is evaluated as satisfactory (2 points).

The study field and cycle are **not accredited** if at least one of evaluation areas is evaluated as unsatisfactory (1 point).

1.2. EXPERT PANEL

The expert panel was assigned according to the Experts Selection Procedure as approved by the Director of Centre for Quality Assessment in Higher Education on 31 December 2019 Order No. V-149. The site visit to the HEI was conducted by the panel on 9th *November, 2022.*

Prof. Dr. David Kennedy (Panel Chairperson), *Head of Department of Mechanical Engineering, Technical University Dublin, Ireland;*
Prof. Dr. Giovanni B. Palmerini, *Professor of Navigation and Space Systems, School of Aeronautical Engineering, The Sapienza University of Rome, Italy;*
Lect. Dr. Bassam Rakhshani, *Lecturer of Mechanical and Aircraft Engineering, School of Engineering and Computing, University of the West of Scotland (UWS), United Kingdom;*
Lt Col Andrius Stuknys (social partner), *Commander of Air Force Armament and Equipment Repair Depot, Air Force of the Lithuanian Armed Forces, Lithuania;*
Mr. Ramil Ahmadov (students' representative), *part-time student of the second cycle study programme "Engineering Business Management" at the University of Warwick (UK), and Quality Manager, Quality Assurance Department, National Aviation Academy, Azerbaijan.*

1.3. GENERAL INFORMATION

The documentation submitted by the HEI follows the outline recommended by SKVC. Along with the self-evaluation report and annexes, the following additional documents have been provided by the HEI before, during and/or after the site visit:

No.	Name of the document
1.	
2.	
…	

1.4. BACKGROUND OF AERONAUTICAL ENGINEERING FIELD STUDIES AT KAUNAS UNIVERSITY OF TECHNOLOGY

KTU is a state-owned university, with 9 faculties, the library, 8 research institutes as well as the departments of administration and support. The University has 1994 employees. The University is currently educating 7689 students of whom 5154 are bachelor's students, 2071 are master's students, 363 are doctoral students, 70 are the students of integrated studies and 31 – the students of professional pedagogy studies.

The 9 faculties are:

- Chemical Technology
- Civil Engineering and Architecture
- Electrical and Electronics Engineering

- Informatics
- Mathematics and Natural Sciences
- Mechanical Engineering and Design
- Social Sciences, Arts and Humanities
- Panevėžys Faculty of Technologies and Business
- School of Economics and Business

The faculties of the University are managed by the Deans and Vice-Deans for Studies and Research and the heads of administration. The faculties carry out the activities of research and studies. The departments are managed by the Heads of the departments. The Deans and the Heads of the departments act according to the Statute of the University. The study fields and study programmes are coordinated by the Field's Study Programme Committees led by the Heads of study programmes.

KTU cooperates with more than 400 research and academic institutions from around the world as well as the representatives of international business enterprises. Within the study field there is strong evidence of high quality and internationally-recognised activity of research being pursued. The academic division for study programmes of the first and second cycles in the study field of Aeronautical Engineering, and the Aviation Engineering is the Faculty of Mechanical Engineering and Design, which holds the accumulated base of scientific research and has the teams of researchers, who have considerable experience and deliver doctoral studies in 4 science fields: Transport Engineering (T003), Mechanical Engineering (T009), Energetics and Power Engineering (T006), and Materials Engineering (T008). The university has a strong link with industry partners who collaborate on research projects, engineering projects, internship and employment of KTU graduates. These partners include; UAB "DAT LT", UAB "Sportinė aviacija ir Ko", UAB "Termikas", UAB "Helisota", UAB "AviaBaltika", UAB "ASU Baltija", UAB "Kaunas Aircraft Maintenance Services" (maintenance base for airline company "Ryanair" in Lithuania), UAB "FL Technics", Lithuanian Air Force Armament and Equipment Repair Depot, UAB "Agrodronas", UAB "Laserpas", UAB "Skyco AE", aeroclubs (in Kaunas, Alytus, Telšiai, etc.), UAB "NanoAvionics", etc.

The study programmes in the field of Aeronautical Engineering have received two accreditations up to present: in 2013 (the AvE programme, international assessment) and in 2016 (AeE, national assessment of a new programme)

II. GENERAL ASSESSMENT

Aeronautical Engineering study field and **first cycle** at Kaunas University of Technology is given **positive** evaluation.

Study field and cycle assessment in points by evaluation areas

No.	Evaluation Area	Evaluation of an Area in points*
1.	Intended and achieved learning outcomes and curriculum	4
2.	Links between science (art) and studies	4
3.	Student admission and support	4
4.	Teaching and learning, student performance and graduate employment	5
5.	Teaching staff	4
6.	Learning facilities and resources	4
7.	Study quality management and public information	4
	Total:	29

*1 (unsatisfactory) - the area does not meet the minimum requirements, there are fundamental shortcomings that prevent the implementation of the field studies.
2 (satisfactory) - the area meets the minimum requirements, and there are fundamental shortcomings that need to be eliminated.
3 (good) - the area is being developed systematically, without any fundamental shortcomings.
4 (very good) - the area is evaluated very well in the national context and internationally, without any shortcomings;
5 (excellent) - the area is evaluated exceptionally well in the national context and internationally.

Aeronautical Engineering study field and **second cycle** at Kaunas University of Technology is given **positive** evaluation.

Study field and cycle assessment in points by evaluation areas

No.	Evaluation Area	Evaluation of an Area in points*
1.	Intended and achieved learning outcomes and curriculum	4
2.	Links between science (art) and studies	4
3.	Student admission and support	4
4.	Teaching and learning, student performance and graduate employment	5
5.	Teaching staff	4
6.	Learning facilities and resources	4
7.	Study quality management and public information	4
	Total:	29

*1 (unsatisfactory) - the area does not meet the minimum requirements, there are fundamental shortcomings that prevent the implementation of the field studies.
2 (satisfactory) - the area meets the minimum requirements, and there are fundamental shortcomings that need to be eliminated.
3 (good) - the area is being developed systematically, without any fundamental shortcomings.
4 (very good) - the area is evaluated very well in the national context and internationally, without any shortcomings;
5 (excellent) - the area is evaluated exceptionally well in the national context and internationally.

III. STUDY FIELD ANALYSIS

3.1. INTENDED AND ACHIEVED LEARNING OUTCOMES AND CURRICULUM

Study aims, outcomes and content shall be assessed in accordance with the following indicators:

3.1.1. Evaluation of the conformity of the aims and outcomes of the field and cycle study programmes to the needs of the society and/or the labour market (not applicable to HEIs operating in exile conditions)

At Kaunas University of Technology (KTU), the External Expert Panel evaluated two programmes, namely;

- Aviation Engineering which is a First cycle, Bachelor of Engineering Science consisting of 4 years Full-time, 240 ECTS programme delivered via Lithuanian and English languages.
- Aeronautical Engineering which is a Second cycle, Masters programme consisting of 2 years Full-time, 120 ECTS programme delivered in Lithuanian and English languages.

These programmes cater for a broad range of careers in the aviation sector and supported by Research and Development, the demand for its graduates is high based on statistics provided for short and long term needs in the industry. It is predicted that the volume of research is going to grow, and the demand for highly qualified professions of the future is going to increase in a broad range of disciplines and careers for graduates of the programme.

The specific Aims of the programmes include:

- Provide knowledge in aeronautical engineering, cultivate the ability to find and apply new solutions assuring the functionality, reliability and safe operation in the development or improvement of aircraft, systems and elements thereof

The Learning Outcomes are outlined as preparing graduates under the headings of;

- Knowledge and Understanding,
- Engineering Analysis,
- Engineering Design,
- Fundamentals and Applied Research,

- Skills of Practical Work in Solving Engineering Problems and
- Personal and Social Skills

These outcomes cover a broad range of headings and skills for preparing students to undertake fundamental engineering and scientific applications to the aviation/aeronautical engineering sector including the ability to Manage, Maintain, Design, Simulate and apply solutions to aircraft systems in a safe and ethical manner. Objectives of the programme also instill Research and Development in students and prepare them to work in teams, be aware of legal requirements in the industry and understand business planning and economic perspectives of their decisions in the sector.

Based on the above and following meetings with the Senior Management Team, Alumni and Social partners, it is evident that there is a high demand from the industry, engineering companies in general and R&D organisations for the skill set of the graduates. The University and Mechanical Engineering Faculty is conducting up to date Research in Drone Technology and UAVs which is of vital strategic importance to the country and its industries and also in external industries, leading to a high demand for the graduates of these programmes.

From the observations made during the visit, the documentation received, meetings with various groups and visitations to the laboratory and research facility, the aims and outcomes conform in a broad way to the needs of society and the labour market.

Overall, it is clear that the University has invested considerable resources into the upgrade of the University and in these programmes, resulting in a big demand for the programmes and preparing the programmes for future opportunities and been able to focus on Global trends in the industries, develop R & D and become a leader in technologies such as UAVs and drone technology.

3.1.2. Evaluation of the conformity of the field and cycle study programme aims and outcomes with the mission, objectives of activities and strategy of the HEI

Kaunas University of Technology (KTU) provides up to 98 study programmes across a wide range of disciplines, catering for the regional and national demand in education and Science/ engineering education in particular.
The University is engaged in high level research with strategic goals and unique deliveries of R&D, educational programmes and industrial collaborations. Campus development and infrastructure is growing due to investments and state of the art R&D facilities as part of the Universities National Innovation and Entrepreneurship Centre. The First Cycle Bachelor degree and the Second Cycle

Master's degree are in high demand for applicants from Lithuania and abroad and the Masters programme offers students a progression from their Bachelor's in the relevant discipline and training. The programmes under evaluation have been offered by the University since 2011(Bachelor) and 2016 (Master) and provide graduates with a wide opportunity of careers in the Aviation sector and engineering industries, which is in line with the Universities mission and Strategy.

As outlined on page 13 of the SER report and based on the observations made on the visit, the university in summary is competitive in the international domain, interdisciplinary, creating and transferring new knowledge and innovations. Its mission to be an agile University, to create and transfer knowledge and innovative technologies, conduct external research, make constant improvement and enhancing the quality of the learning and research outcomes and creating a University infrastructure based on reliability, creativity, and leadership is noted.

The University Strategy is in line with the aims and learning outcomes of the programmes which include development of the international activities, study quality to meet international standards, development of competences of the academic staff, modernization of the teaching and learning, environment, Research and innovations, and sustainability.

This Mission and Strategy of the University are embedded in the Design and delivery of the First and Second cycle programmes under evaluation as observed by the visiting panel.

3.1.3. Evaluation of the compliance of the field and cycle study programme with legal requirements

The first cycle of studies (Aviation Engineering) consists of 4 years Full-time and 240 ECTS. 141 ECTS contribute directly to the field studies, professional practice (15 credits) and project preparation (15 credits). 15 Credits is allocated to the Final Degree Project and 12 credits to general modules from across the University. 6 credits are allocated to the subjects under Social Sciences and 36 credits to the core subjects of Engineering. Other modules covered include Mathematics and Science (30 ECTS). 27 ECTS are allocated to specialisation subjects such as Design of Aircraft and Technology of Aircraft's Technical Maintenance. These credits are within the legal requirements of the programme as shown in Table 1.

For the second cycle of studies (Aeronautical Engineering) consisting of 2 years Full-time, 120 ECTS, 60 credits is allocated to the field studies, 30 credits for the final degree project and 30 credits

allocated to the research works and subjects of other fields across the University. Credit allocations are highlighted in Table 2. for this cycle. However, it was noted that credits given to project preparation could be duplicated in the final Degree project. This issue was raised during the meetings with the Teaching staff and some modifications may be required to prevent any duplicate counting of credits.

Table 1. Study Programme's *(*Aviation Engineering*)* compliance to general requirements for *first cycle study programmes*

Criteria	Legal requirements	In the Programme
Scope of the programme in ECTS	180, 210 or 240 ECTS	240
ECTS for the study field	No less than 120 ECTS	141
ECTS for studies specified by University or optional studies	No more than 120 ECTS	12
ECTS for internship	No less than 15 ECTS	15
ECTS for final thesis (project)	No less than 15 ECTS	15
Contact hours	No less than 20 % of learning	2146
Individual learning	No less than 30 % of learning	3294

Table 2. Study Programme's ***(***Aeronautical Engineering***)*** compliance to general requirements for *second cycle study programmes*

Criteria	Legal requirements	In the Programme
Scope of the programme in ECTS	90 or 120 ECTS	120
ECTS for the study field Information Services	No less than 60 ECTS	60
ECTS for studies specified by University or optional studies	No more than 30 ECTS	18
ECTS for final thesis (project)	No less than 30 ECTS	30
Contact hours	No less than 10 % of learning	937

Individual learning	No less than 50 % of learning	2268

3.1.4. Evaluation of compatibility of aims, learning outcomes, teaching/learning and assessment methods of the field and cycle study programmes

The study field at KTU offers two study programmes; 1) aviation engineering in the first cycle, and 2) aeronautical engineering in the second cycle. The goals of the study programmes as stated in SER section 2.1.4-68, are to provide knowledge in aeronautical engineering to find and apply solutions for the functionality, reliability and safe operation and improvement of aircraft and its systems and elements (first cycle). For the second cycle the goal is to provide knowledge in aeronautical engineering to develop the ability/capacity to design, analyse and assess the performance of conventional and unmanned aircraft, satellites and their systems and elements. In achieving such goals KTU has demonstrated the compatibility of the programmes in terms of the types of modules utilised in the study programmes to provide active learning and learning outcomes linked to study cycles in general and to the study objectives in particular. Annexes 4.1.1-2, and 4.4.1-2 provide a comprehensive map of the learning outcomes provisioned for the study programmes and that are linked to individual study subjects across the two programmes. The study subjects are clustered into 8 groups for the first cycle and 4 groups for the second cycle. These groups represent the required competencies, skills and abilities for the study cycles. The study methods employed for the delivery of the study subjects consist of active learning such as; individual project, design-based thinking, and creative workshop. Theory teaching methods are performed by traditional lectures, consultation seminars, and tutorials (problem solving). The assessment methods outlined in annexes 4.1.1-2 include a range of HE standard forms that are explicitly pursued by KTU within the given programme delivery framework, and along with the learning outcomes they are in line with EUR-ACE Accreditation standard (National Progress Programme (lrv.lt)). The panel is of the view that the study programmes delivered by KTU are in full agreement with the requirements of the study cycles level and standards. It is believed that there are no (significant) gaps in the format and methods of delivering the study modules, assessment types and their robustness. However, student representatives during the meeting with the panel have expressed their desire for further and/or additional experiential teaching and learning of avionics-based topics and to address the lack of (more) problem-solving activities. Moreover, some of the social/industry partners have noted that more emphasis should be placed on computer coding, software packages training, e. g. CATIA, ANSYS, etc. Also, provide students with more hands-on skills in workshop activities and working with tools

and equipment. Student representatives noted the need for more design and engineering simulations too. Given the availability of such resources within KTU, the panel recommends that a closer look should be taken to adjust the intensity of use of simulation in laboratory work, coursework, projects etc. The panel believes reflecting on such recommendations would enhance the compatibility of the programmes not only with the study cycles, but also with the industry standard/requirements in particular, and ultimately enhance the assertion and achievement of the intended learning outcomes.

3.1.5. Evaluation of the totality of the field and cycle study programme subjects/modules, which ensures consistent development of competences of students

The structure of the study programmes that is laid out in annexes 4.1-2, clearly illustrate the distribution pattern of the subject groups in relevance to the learning outcomes assigned to semester/year of study. The order of delivery of each study subject group is related to the level of knowledge developed in the given semester/year. Core university subjects for instance are delivered in the first year of study, which serve as prerequisites for major study subjects at higher levels. The arrangement of the study subjects and organising the delivery methods in respect of their level of requisite in the given stage of the programme, is strictly commensurate with the HEI standard and common university practice. The concept of delivering fundamental knowledge based at lower stages, and projects, practical and internship at higher stages of the study timeframe is quite evident in the study plans. The cycle of students achieving theoretical knowledge/skills at the first years of the study and acquiring/establishing practical, teamwork and industry knowledge at the final years is quite clear and evident. The level of knowledge delivered by the programmes and acquired by the students is consistent across the years and semesters of study. It seems there is a smooth progressive pattern in the knowledge, skills, application and practical experience evolved over the duration of the study. As evidence provided by social partners, students entering internship and/or employment do largely satisfy the knowledge-requirement criteria.

Referring to SER (section 2.1.5-76), an example of how research skills are embedded in the second cycle programme and acquired by students is demonstrated and shown in annex 4.1.2.

There are two study modules (research project 1 and 2) that are largely employed to develop research skills, and seem linked to the master final project. The panel expressed a concern on the allocation of the size of credits (6 to each), which in total if added to the final master project may exceed a size of credit of that of common standard (30 credits). Also, it is not clear what kind of topics are offered in research projects 1 and 2, and to what extent these topics are linked to the master final

project. The panel believed it may cause a conflict in the assessment/marking process. A revised arrangement of the modules credits, linkage to the master final year project and clarity on the marking would be advantageous to the study cycle in general and study programme in particular.

3.1.6. Evaluation of opportunities for students to personalise the structure of field study programmes according to their personal learning objectives and intended learning outcomes

According to SER, section 2.1.6, students have the opportunity to personalise their studies in a number of ways;

- first cycle study programme provides the option of choosing a bridging course in the first semester to fill any knowledge and bringing up the level to the one required for the study cycle.
- the choice for elective modules (2 out of four, worths of 6 credits each)
- the opportunity to achieve deeper specialisation in areas of personal interest through the choice of elective subjects. The elective subjects are listed within two strands of speciality; (Aircrafts Design and Technology of Aircrafts Technical Maintenance) – an efficient approach to embed and maximise the opportunities for students to pursue a route of speciality close to their interest and/or capability. During the meeting with representation of the social/industry partner, the panel explored the destinations of students' internship and employment, all of which have indicated that there has been a fair split between those going to technical maintenance and the ones have chosen to go to design-based employment – a very good indication of the implementation of the specialisation choice in the programmes.
- within the second cycle study programme there is an option of choosing a study path from two available strands; 1) MA+ competence, and 2) optional modules selection from the list of the subject group “competence elective” (annex 4.1.2)
- the MA+ strand offers two paths: field expert, and interdisciplinary expert. The field expert facilitates to build a deepened expertise in the field of aeronautical engineering, where the interdisciplinary expert offers study options in the field of management-based portfolio; change management, business processes and supply chains management, data analytics, project management, process validation, etc.). The panel finds such diversity in study programmes as a great way to maximise opportunity for personalisation, though the internship and employment evidences were to some extent unclear to the panel. A clear career pathway and/or portfolio should be defined so students can have a clearer envisagement and planning. Also, it is not clear to what extent career advice is available to students when making a choice for any of the above paths. It is highly recommended that students are provided with

comprehensive advice and guidance in order to ensure they are making a fully-informed decision.

3.1.7. Evaluation of compliance of final theses with the field and cycle requirements

Final degree projects/thesis are regulated by KTU internal guidelines. Procedures for selecting, preparing, defending and assessing theses are outlined in the guidance (SER, section 2.1.7-79). Topics for the final year projects are largely proposed by academics, and also project topics can be proposed by students, industry and in partnership with European universities. Students are supervised by lecturers from the relevant discipline area, and as stated in SER in order to ensure the compliance of the final year projects/theses with the study cycle, the field's SPC supervise, assess and oversee the topics, quality and process of proposals. The approved list is then published to the students for selection. Example list of final year projects for first and second cycles are presented in annexes 4.2.1-2. The panel has reviewed a sample of final year projects from both cycles. The topics are highly relevant to the study field and comprise a good level of technical contents in the forms of simulations, programming, etc. The panel found the awarded marks to the projects a little too high. In general, the marks presented in appendices 4.2.1-2 for the period of 2019-2021, show that the average mark awarded to projects is >8. This is fairly a high result, that may require further review and perhaps a more stringent assessment criteria. The panel is not fully clear of the contribution's extent of research project 1 and 2 to the final year project in the second cycle. And whether they have contributed to the marks being relatively inflated. Nevertheless, good practices that ensure compliance with the study cycle standards that are pursued by KTU include:

- Students complete and pass training on literature review and referencing
- projects proofread, and checked for similarity score
- the projects are defended in the public meeting of the Qualification Commission of the study field
- the defend/assessment commission consists of expert members from the study field, practitioner-professional, representative of employers, and an external assessor

Examples of an assured-quality project performance are given by a social partner/employer during the meeting with the panel, in which it was noted that students conducting and completing their final year project at employer's environment, will most likely to be employed by the employer as they find the quality of students' performance and their projects of high standard.

The panel However, recommends that the final year thesis module (second cycle) requires some adjustment in terms of awarding credits, and the level of contribution offered by research project 1 and 2. There should be a clear formulation - and statement - of the research projects aim and objectives. Also, a clarity on the type of topics offered in these projects and whether they are directly related to the thesis topic.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. Strong scientific and technical contents, manifested in the learning outcomes and demonstrated in the delivery of the modules, in both theoretical and practical contexts
2. Availability of word-class campus, lab, workshop and research facilities, utilised for skill development, research-teaching linkage and hands-on skills development - all of which are well demonstrated by the quality of research output, structure of the programmes, knowledge exhibited by students, and currency of technology embedded in the curriculum
3. Embedment of a variety of well resourced, scientific/engineering laboratory and workshop sessions ensuring technical skill development and consolidation of the theoretical teaching

(2) Weaknesses:

1. Engagement with aeronautical professional bodies/communities/associations/etc., and staff research-teaching movement (conference, events, external collaboration)

3.2. LINKS BETWEEN SCIENCE (ART) AND STUDIES

Links between science (art) and study activities shall be assessed in accordance with the following indicators:

3.2.1. Evaluation of the sufficiency of the science (applied science, art) activities implemented by the HEI for the field of research (art) related to the field of study

The offer in terms of courses and activities in the aeronautic domain and in related disciplines is definitely rich. Such an abundance enables for a large injection of applied sciences' contents in the curriculum. At the same time, the opportunities available to students to delve into the syllabus, enhance their interests and to apply the knowledge acquired in the programme are quite large.

Overall, the projects and efforts related to applied sciences implemented in the framework of KTU activities are far more than sufficient to provide the correct environment to develop and sustain the programme. In addition, there is a clear benefit from the large size and large/modern university mindset of KTU.

The study programme is wisely built not only on the expertise of a single department, but on a number of knowledge centres and competencies spread all around and concerning different disciplines. This is the case of research centres belonging to the university (as the Ultrasound Research Institute) as well as the case of partnering entities, public or private firms, consistently cooperating with the HEI. In such a way, the study programme benefits from the typical atmosphere of a large university, inspiring motivation and involvement in research, as well as of the lively and sharp environment of the economic situation of the city, suggesting a direct connection to real life as typical of engineering.

3.2.2. Evaluation of the link between the content of studies and the latest developments in science, art and technology

The programme is clearly tackling current developments in the discipline. The number of labs, and the wide range of activities at a good research level performed there, help in strengthening the link between the study programme and the latest developments in the field of aeronautics and aerospace at large. Single courses' syllabus (as far as it refers to second cycle) are oriented to be up-to-date with current technology. Also, all the topics proposed for these are related to current research projects, ensuring the requested and expected link.

The attempt to stay at the forefront of technological developments is especially relevant in the frame of Master level courses, where specific learning paths have been identified in two areas largely agreed and recognized as really promising, namely the unmanned aircraft systems and the small satellites. These areas, also according to the ideas of the management, should be the subject of future attention and development in the programme, strengthening the relation between the content of studies and the latest developments in science and technology.

In addition, the internships, the students' mobility and in several cases also the work experiences of the students do certainly help in generating an environment capable and prone to receive information and generate interest about latest developments in technology.

Notice that this interest is not purely academic or kept aside practical problems. In fact, it has been noted and appreciated during on-site visits that social parts and local partners agreed that KTU staff skills and KTU equipment and labs' capabilities are quite useful to industry, as they help through their labs and research to solve their specific, real world engineering problems.

3.2.3. Evaluation of conditions for students to get involved in scientific (applied science, art) activities consistent with their study cycle

The judgement concerning this aspect is extremely positive. Students' involvement in research activities, lab sessions, exchanges and internships are high, offering an up-to-date study schedule with respect to aeronautics' technology. The participation in the Erasmus programme is widely supported, and there are chances for students to have internships in high-level research centres such as NASA. Students who would like to increase their knowledge have a wide range of labs available, and a quite helpful teaching staff, motivating them; in addition, they are encouraged to prepare presentations and to participate in conferences. Active students from different levels can also participate in challenges, often at the international level.

However, it has to be reminded that this is an area in need of continuous attention, in order to involve as many students as possible and – for the institution and teachers – to be proactive so that even working students or the ones being a bit late with courses or exams could benefit from these important options.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. The study programmes are efficiently managed by a large and modern university, aimed at excellence, and benefits from this advantageous environment in terms of resources, labs, education proposals, availability of internships.
2. Involvement of students in research activities, lab sessions, exchanges and internships seem to be traditionally quite high, offering the impression of a study programme up-to-date with respect to aeronautics' technology, carefully crafted and nicely working in preparing high level engineers.

(2) Weaknesses:

1. The two innovative programmes on unmanned aircraft systems and nanosatellites should be supported by a larger number of specific, dedicated courses than the ones available at this time.
2. Continuous attention should be devoted to having all students – even the ones who for any reason are a bit late or lazy – involved in the rich set of activities, exchanges, labs. In such a way the HEI will fully implement its education mission.

3.3. STUDENT ADMISSION AND SUPPORT

Student admission and support shall be evaluated according to the following indicators:

3.3.1. Evaluation of the suitability and publicity of student selection and admission criteria and process

The website of the university provides detailed information about admission requirements and conditions for all levels of study, including the exchange and transfer studies. In addition, each section of the page gives all supporting data corresponding to the study cycle such as; financial, admission requirements, FAQ, covering the cases for international students as well. There are clear and adequate supports in place to meet the needs of first and second cycle programmes. Another positive fact is that there is a direct online contact/chat with current students available to reach out for questions and queries. Where you can ask the questions related to the student's life and study matters. Provided information for both cycles of the study are clear and accessible for all students.

3.3.2. Evaluation of the procedure of recognition of foreign qualifications, partial studies and prior non-formal and informal learning and its application

Procedures and related requirements of recognition of learning outcomes from other HEI and other types of education are provided and regulated via the specific guidelines and procedures of KTU. These documents cover the recognition of competences acquired via formal, informal, and non-formal education as well. The maximum number of 75% of the scope of the study programme from formal and 50% for informal and nonformal learning achievements could be added to the intended study. The partial studies options are also available for the students via the "EU Erasmus+" programme or for the students eligible for the organisation and financing the partial studies. The related requirements, conditions and procedures could be accessed via "The Guidelines for the Partial Studies under the "Erasmus+" Programmes and Bilateral Cooperation Agreements" and "The

Guidelines for the Inclusion of Learning Outcomes approved by Order No. A-372 of the Rector of Kaunas University of Technology of 1 September 2020".

3.3.3. Evaluation of conditions for ensuring academic mobility of students

With the core idea to provide students opportunities to share and get the latest knowledge and skills KTU has very close relationship and has established strong collaboration with the several leading universities from several leading universities from Europe, EuroAsia and CIS countries. Besides that KTU provides international internship opportunities to enable students obtain the international professional work experience, acquire knowledge and insight about the EC labour market requirements, and establish professional networking and communication lines. The main tool for the student exchange is the "Erasmus+" programme, where the KTU Mobility scholarship options are provided for students as financial support. Along with the "Erasmus+" the exchange study opportunities are provided via NORDTEK, State Scholarship and other programs. The "KTU DISCOVERed" brand and KTU websites provide to the public all necessary information regarding the mobility opportunities. Thanks to the efficient effort made by KTU for the last 3 years, a total of 17 students participated in partial studies and practices in different universities and companies.

3.3.4. Assessment of the suitability, adequacy and effectiveness of the academic, financial, social, psychological and personal support provided to the students of the field

The information regarding available supports, including but not limited to: financial, social, psychological, and etc. are provided via KTU Student Information and Service Centre.

The academic support is provided via the KTU brand, the mentorship programme "GUIDed". The programme is aimed to convey and communicate the knowledge, skills and experience of mentors to students. The assigned mentors, as well as all supervisors, teachers, instructors are readily available to transfer their knowledge to students, provide necessary academic support, as this approach is one of the core values established at the corporate level by the KTU.

Another brand of the KTU – "GIFTed" Talent Academy – provides students with opportunities to enhance and apply their knowledge and proficiency to industry business areas.

Along with the academic support, KTU provides well-established financial support as well. There are several supports available for students such as: tuition fee exemptions, scholarship for students with

exceptional academic achievement, the nominal Patron's (Sponsor's) scholarship, targeted payments for students with disabilities, etc.

3.3.5 Evaluation of the sufficiency of study information and student counselling

There are several ways and tools established by KTU to provide students with all necessary information regarding the study fields. Organization of "Welcome Weeks", preparation and distribution of booklets, meeting with Deans for studies and HSP, tour of facilities, etc. are some of them. The "Introduction to Aviation Engineering Speciality" module, conducted during 1st semester, gives specific information applicable to the Aviation Engineering study field. In addition, the assigned senior students also help "freshmen" easily and faster adaptation to KTU student community.

All information and documents related to students and studies are provided via KTU Intranet, weekly newsletters, via emails and by faculty Study Centres, Students Affair Department. Students are able to consult with programme teacher study alternatives. Also, students are involved in field trips, industry visits, where they can be in touch with the aviation industry and market, as well as get insight into how their future career depends on their study field's theoretical knowledge.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. Availability of brands, such as, GIFTed, GUIDed, WANTed, etc, which provides well established and organised support to all possible aspects of student's life.

(2) Weaknesses:

Not known

3.4. TEACHING AND LEARNING, STUDENT PERFORMANCE AND GRADUATE EMPLOYMENT

Studying, student performance and graduate employment shall be evaluated according to the following indicators:

3.4.1. Evaluation of the teaching and learning process that enables to take into account the needs of the students and enable them to achieve the intended learning outcomes

The study programmes are delivered in a number of formats: traditional classroom sessions, laboratory works, seminars, and site visits. Teaching materials are available online and studies are

provided on-campus, remotely or blended learning. The on-campus sessions are timetabled for day time delivery, evening and weekend – all of which would maximise participation of students and engagement with the study. For measures to encourage active engagement, the SER, section 2.4.1-173 refers to activities such as: project activities (preparation and visualisation of projects), design thinking, creative workshops, work in teams, study visits, discussions, interview, problem-solving sessions, activity reflection, idea maps, etc. Although all of these are pursued by KTU in a thorough manner (evidenced by the panel via meeting with management and academic staff). However, students expressed the need for more problem-solving activities for the first study cycle. Moreover, they indicated including more engineering activities in the teaching and learning process would be beneficial to their skills development. Given the availability of workshops and lab facilities at KTU campus sites, the panel believes addressing such needs would enhance the experiential learning of students, and ultimately leads to the attainment of learning outcomes concerning "Skills of Practical Work in Solving Engineering Problems".

Further measures that are taken by KTU to ensure constant student engagement in both programmes (first and second cycles) includes; implementing an accumulative assessment system. In this system the final mark of a module would consist of a weighted mark contributed by the interim assessment, and a weighted mark contributed by the final assessment/exam. So, students will need to meet the pass criteria for the module across the entire semester and not only at the final assessment/exam – a useful effort to keep students engaged and assessed throughout the semester, ensuring the achievement of the intended learning outcomes. In general students (from both study cycles) seem to be satisfied with the process of teaching and learning, as evidenced during the meeting of the panel with student representations. Students are receiving all the help and advice from their tutors, have full access to research papers, books and other materials/resources. Students entering internship and/or employment demonstrate a high level of skills standard as evidenced by social partners. Particular skills that were highlighted by employers – and seen as a result of quality of teaching and learning – are: communication skills, new ideas, leadership, good level of engineering language, etc. As such the panel's view is that the teaching and learning process at KTU fully satisfies the criteria for student needs and attainment of learning outcomes.

3.4.2. Evaluation of conditions ensuring access to study for socially vulnerable groups and students with special needs

KTU follows its internal regulations in implementing Equal Opportunities and Diversity Policy (SER, section 2.4.2-177). KTU Student Information and Service Centre oversees the provision for general information provided to first year students that is labelled as "Adaptability of Studies for the Students with Special Educational Needs" of KTU website. Students with special needs are assigned with a social welfare coordinator, who provides assistance related to study issues, scholarship, financial support, and other matters concerning students' wellbeing. As per KTU policy, students with special needs are provided with extra resources and time when sitting assessment/exam, and there are flexibilities with learning achievement as well. Students are frequently surveyed – by the use of online surveys available on "Emotional and Physical Health" of KTU website. These surveys are designed to identify students' personal needs and help adapt the process of studies to such needs. KTU (through its Department of Student Affairs) recommends and conducts a series of training and events for admin and academic staff on the mattress of disability, culture of equal opportunity ethics and adaptation of studies, etc. – a very positive attitude towards inclusion and equal opportunity enhancement. The panel has not had any opportunity to meet with representation of special needs student groups, nor witnessed relevant evidence, though according to the description and statements provided in SER, the panel believes that there is a strong provision for addressing the needs of vulnerable students at KTU. As referenced by SER in section 2.4.2-180, in the assessment period, two students with a hearing disability were studying in the field of aeronautical engineering that were receiving appropriate support.

3.4.3. Evaluation of the systematic nature of the monitoring of student study progress and feedback to students to promote self-assessment and subsequent planning of study progress

At KTU and within the Department of Academic Affairs, students monitoring objectives for both cycles are set to assess and evaluate indicators of students' progress, examinations, evaluation of measures for the quality of studies, termination/interruption of studies, attendance indicators, and violations of academic ethics. Evidence of systematic monitoring found in SER section 2.4.3-183, discussion with management, academic staff and student representations. These measures are standard HEI practices of monitoring that KTU pursues accordingly and fully. Academic Information System (AIS) is a platform where students' attendance, grades, assessments data are recorded (SER, section 2.4.3-184). Information on student performance/achievement is assessed for possible action, should the system indicate deterioration of achievement indicators. In which case academic mentors will interfere to prevent discontinuity of study and/or help with matters that deem to impact study progress – a very common and standard practice in HEI that KTU has made full implementation of.

The panel strongly believes that the systematic monitoring process is an integral part of KTU procedures for students' achievement and progress.

Feedback to students is another academic process that KTU has demonstrated to the panel to be an integral part of its procedures. Academic tutors provide timely feedback on assessment performance, mark achieved and reflection on completed academic works, such as; lab report, thesis etc. These have been evidenced by the panel through meetings with academic staff and students, and also by review of students' works (assessments, theses, lab reports, etc.). The panel is of the view that the monitoring of students' progress at KTU is systematic, continuous and thoroughly implemented.

3.4.4. Evaluation of employability of graduates and graduate career tracking in the study field

Employment opportunities for graduates of the Bachelor and Master programmes in KTU are extremely high at the moment with a shortfall in the aviation sector of up 5,000 vacancies in the next 10 years. Graduates of the KTU programmes are specifically sought after in R&D, Design, Manufacturing and Business in relation to the Aviation Industry and engineering companies in general, both nationally and internationally. Based on the SER report and meetings with the Senior Management, Students groups, Alumni and Social partners, there is a high demand for graduates in the Aerospace industry in Lithuania and to date, graduates have ample opportunities to work and develop their career choices in this sector. The University conducts surveys with the industry to ascertain career opportunities and future roles in the technologies and career paths. All students of the programmes experience Internships in relevant industries, providing them with specific skills currently in demand. Statistics on graduate employment and range of careers were discussed and appear to be relevant to the requirements of the industry and employer needs. Employer groups indicated a high demand for graduates.

Examination of the range of physical equipment and kit for training also reinforces the employability of graduates. Competencies developed by students include design, functionality, stability and safety of Aircraft along with Project Management, R&D, specialist scientific studies, experimental work and Project based skills at the Masters level. Log books highlight the work and hours completed within the aviation sector and for some students, the NASA experience is highly recognised by employers seeking specific skills.

3.4.5. Evaluation of the implementation of policies to ensure academic integrity, tolerance and non-discrimination

The University's administration assures compliance with the University's Statute and KTU Provisional Academic Regulations by applying its internal legislation regulating employment relationships. The Board of Academic Ethics ensures compliance with the Code of Academic Ethics. An Equality Committee also forms part of the University Structure to deal with complaints from students or staff.

Based on the interviews with students and teaching staff, there is strong evidence that policies of good practice are in place to ensure academic integrity, tolerance and non-discrimination. Details on the Quality Assurance systems and policies and how they are implemented within the University and nationally highlight this (SER Report). Students have a voice on Academic Boards whereby they can raise issues of concern on a range of matters that may arise from academic standards, quality of programmes, technical equipment and external activities such as work placements. Policies on plagiarism are well documented and adhered to. In meetings with lecturing staff and students, it was evident that all matters from an academic integrity can be addressed via the QA and management structures in place. Students' engagement with the Erasmus Scheme, NASA competition, work Internships, design of academic learning programme and engagement with Industry all point to a successful formula and practice for developing the learning of both national and international students. Prior Experiential Learning for students coming from different countries is recognised and supported. Staff development is supported and encouraged. Student surveys allow students to evaluate lecturing staff and this information is assessed at University level and discussed openly in relevant Fora. It was evident that good practice in dealing with students in particular, identifying any weaknesses in the studies and supporting staff for further studies is evaluated and actioned on by the University.

3.4.6. Evaluation of the effectiveness of the application of procedures for the submission and examination of appeals and complaints regarding the study process within the field studies

The SER report (Page 45) highlights the procedures for dealing with complaints and appeals. The process is clear and unambiguous. It also outlines who to contact before making an appeal or complaint and delivery of such complaints and the schedule of events and response times. The University employs a Quality Manual (No. V3-S-45 of the Senate of Kaunas University of Technology of 11 June 2014) highlights the responsibilities and range of activities that come under the remit for dealing with modifications, training and overall well-being of the programmes, staff and students and indicate how complaints and feedback are dealt with. Students, teachers and the study programme

committee can meet to deal with programme and academic related issues. Students can appeal their grades and scores in these areas and be addressed by the Management Team.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. The availability of specialised and well-equipped labs and workshops, are great means for students enhanced learning and certifying of knowledge.
2. Active research labs are pursuing credible research that seem well informing the study programmes contents, and support students research skills.
3. Engagement of students with research and international projects (NASA) – it is a great indicator of the study programmes performance.

(2) Weaknesses:

1. A more clearer and explicit career routing to aircraft maintenance licence qualification (EASA part 66).
2. Reflection of licence qualification on the study programme.
3. The aircraft design route is of less clarity when it comes to internship and career landing post-graduation.

3.5. TEACHING STAFF

Study field teaching staff shall be evaluated in accordance with the following indicators:

3.5.1. Evaluation of the adequacy of the number, qualification and competence (scientific, didactic, professional) of teaching staff within a field study programme(s) at the HEI in order to achieve the learning outcomes

The teaching staff involved in the study programme is rich in number and competences, and certainly adequate to the need. This very positive condition has been achieved by an active hiring of new resources, maybe as a result of previous recommendations (notice also that KTU has been granted a specific label – the Human Resource Excellence in Research – for effective hiring practices).

Concerning qualification, some additional effort in directing hiring towards the fields peculiar to Aeronautical Engineering could be welcome. This is especially true when looking at the Master level studies with regard to the two paths of Unmanned Systems and Nanosatellites: if, as expected, these paths will attract a number, or even the majority of students, the courses' offer shall be enlarged, and instructors with specific expertise, only partly available as per today, will be in need. Notice that, as per today's situation, this issue has been partly and cleverly solved by stressing the interdisciplinarity character of teaching, which is appropriate and perfectly matching modern engineering's approach. However, specialisation cannot be avoided in the last, deeply oriented courses of these emerging subjects and specific hiring would be better put in place.

3.5.2. Evaluation of conditions for ensuring teaching staffs' academic mobility

The percentage of instructors experiencing mobility seems correct, even if the nature and duration of their appointments is not clear. Mobility is supported by the university and happens mainly through Erasmus+, with active participation and results. KTU involvement in European universities alliances is also important to promote experiences exchange. Furthermore, funding of participation to conferences, especially for younger teachers, helps in ensuring the possibility to create links with other – especially international – universities

3.5.3. Evaluation of the conditions to improve the competences of the teaching staff

Competencies of the teaching staff are adequate to the study programmes offered, and the group of instructors looks motivated and deeply involved in interesting, up-to-date research, both with a local as well as with international (especially cooperative programs as the EU's Horizon ones). However, teaching staff should strive in order to improve the scientific publication records. Notice that national conferences or experiences are not enough for a good academic involved in a modern programme, as the case for KTU aims to be.: especially for the master programme excellence in research should be continuously pursued in order to be capable to teach. Furthermore, due to the intrinsically advancing nature of the research, and to the peculiar characteristics of the Aeronautical Engineering, clearly at the edge of technological advances, excellence cannot be deemed as achieved for a long time but should be continuously targeted. Overall, the current status of teaching staff involved in the programme – as reported in the Self-Evaluation Report provided by the institution – is not fully satisfying. While there are certainly niches of excellence, number and publication venues of the scientific papers are not high, and certainly not at the top of European rankings in the aeronautical engineering field.

A very positive aspect is represented by the EDU_Lab initiative, aimed to improve teaching capabilities. There is a continuous monitoring of the courses and analysis of the performance, providing as output individual suggestions to improve quality of lectures. There is a teaching evaluation process by students which is "digested" in order to extract the suggestions useful to improve the programme. There is an effective organisation about how to handle feedback from students. EDU_Lab appears to be an experienced venture, seemingly appreciated by teaching staff, to be even probably considered a model for other universities.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. The teaching staff is rich in number, well distributed among different disciplines pertaining to the study programme and increasingly adequate in terms of qualification. It looks that suggestions from previous accreditation exercises have been duly implemented.
2. The attention to the effectiveness of teaching and to the optimization of the learning experience is extremely high. The Edu-Lab initiative should be especially commended, as a real help to teaching staff to maximise their professional outcome

(2) Weaknesses:

1. The research output from teaching staff still needs to be improved. There are certainly some very good and productive scientists, but the number of publications should be enlarged, and a specific attention should be paid to the venue of these publications (conferences, internationally renowned specialist journals). Only by stressing this issue could the study programme in Aeronautical Engineering match and then help to maintain KTU's shared targets of excellence.

3.6. LEARNING FACILITIES AND RESOURCES

Study field learning facilities and resources should be evaluated according to the following criteria:

3.6.1. Evaluation of the suitability and adequacy of the physical, informational and financial resources of the field studies to ensure an effective learning process

During the visit, it was verified that to fully implement the principles of the Charters of European Researchers and Great European Universities, Kaunas University of Technology is creating an open

environment in which the individual differences, characteristics, potential, and contributions of all its employees and students are recognized and evaluated. Every worker and student has the right to work and study in an environment that promotes respect for the dignity of each person. The University is becoming increasingly international, carrying out many international scientific projects and research and bringing together many former small departments, institutes, and modern marketing into more valuable formations.

The quality of studies has also been greatly improved: the focus on study processes, the enhanced selection system, and the flexibility of the programmes, allowing the student to choose modules that meet their needs. However, the aim of the University is not merely to maintain the status quo, to constantly update teachers' knowledge, and to seek technological innovations.

During the visit to the University, it was found that an adequate number of classes with modern audio and video equipment are used for aeronautics programmes, and laboratories are equipped with safe laboratory equipment. Students of the aeronautics programme are taught different modules, with social science lectures as core courses. Students can comprehensively deepen their knowledge in prepared laboratories in chemistry, physics, human safety, electrical and electronic circuits, and applied electronics, where they carry out work in general chemistry, applied physics, ergonomics, electrical circuits, and electrical and light engineering.

According to other study modules in the engineering field, the leading laboratory works are carried out in the Faculty of Mechanical Engineering and Design laboratory centre, including thermodynamics and heat exchange, thermodynamics and mechanics, dynamics, engineering mechanics, measurement engineering, and material engineering.

Theoretical classes under the study programmes in the field of aeronautics engineering are carried out in 23 classes at the Faculty of Mechanical Engineering and Design, where the total number of jobs is 1087. The main practical activities and laboratory work are carried out in specialised laboratories of the Faculty of Mechanical Engineering and Design, the Faculty of Electricity and Electronics, the Institute of Mechatronics, and Prof. K. Baršauskas Ultrasound Research Institute.

During the visit, the Panel visited KTU Santaka Valley, a research and experimental development centre open to Lithuanian and foreign research and study institutions and business representatives. The Panel was impressed by its ability to combine innovative technologies and knowledge-intensive companies, embodying synergies between research, studies, and practical implementation of ideas. The Valley consists of two interrelated parts, the Science and Technology Centre and the Technology

Business Incubator. During the visit, it was presented and verified that KTU "Santaka" valley is one of the largest centres of this type in Lithuania. About 350 projects are installed in the Science and Technology Centre and the Technological Business Incubator, and the installed equipment is worth almost EUR 26 million. The research space covers an area of 9 thousand sq. m., and 3.5 thousand sq. m. is dedicated to business. The total value of the project is more than 43 million euros.

Students can carry out independent tasks, and additional spaces are also available for this activity, including a seminar/Laboratory for student creative activities and a centre for product design and development (total number of jobs — 99). In teaching and research laboratories, there is regularly updated laboratory equipment suitable for use at the technical level and necessary for the study process, which is ideal for the number of students and allows for achieving established learning outcomes in the field of aeronautics engineering.

The Aerodynamics Research Laboratory was also presented to the Panel, where students can perform individual practical tasks, construct various models, and use diagnostic equipment and aerospace devices.

Research is carried out in aerodynamic research laboratories, nanoavionics, and aviation systems laboratories; projects are implemented using the funds received for the research work carried out, research funds provided by the University, and material support of UAB "DAT LT."

The use of laboratory equipment ensures learning outcomes and allows for appropriate research and projects in aeronautics engineering. Students perform practical sessions using the UAB "Helisota" aero-device testing laboratory and the Kaunas Aero Club aircraft testing laboratory test benches.

The status of existing computer classes and software is sufficient to ensure the proper effectiveness of information technology training. The hardware and software used are modern and legal. For administrative convenience, all computers are connected to the local network. Training and learning of aviation parts drawings are carried out using the Autodesk AutoCAD package, and 3D design and numerical analysis of components and aggregates are carried out using applications such as SolidWorks, Autodesk Inventor, CosmosWorks, ANSYS, CATIA, MotionWorks, Inventor, LsDyna, MSC/ADAMS + Rail, and other software packages.

During the visit, it was verified that the technical staff of the University ensures the functionality of the laboratory equipment. The equipment required for practical and research work provided for the study subjects in the field of aeronautics engineering is distributed proportionally in the laboratories

of aviation systems. Students are fully able to conduct aerodynamic research, facilitated that the student carrying out the research work can use additional special test equipment and software available in other faculty departments.

During the visit, it was noted that the University provides learning conditions for persons with reduced mobility by installing specialised platforms and elevators. The workplaces are adapted, and the flexible supply of study materials to persons with special needs is carried out through the Social Welfare Coordinator of the Department of Student Affairs. Parking areas near the buildings have parking lots for people with disabilities and are permitted to use internal car parks.

The University offers aviation internships in various civil and military companies, and the practice is carried out based on a tripartite agreement between the company offering the placement, the University's representative faculty, and the student. Cooperation agreements have been concluded with: UAB "DAT LT," UAB "Sportinė aviacija ir Ko," UAB "Termikas," UAB "Helisota," UAB "Aviabaltika," UAB "ASU Baltija," UAB "Kaunas Aircraft Maintenance Services," UAB "FL Technics," UAB "Agrodronas," UAB "Laserpas," UAB Skyco AE, UAB NanoAvionics, etc.

The University's central library and its departments have an internet connection with academic departments, which makes it easier for students to search and subscribe to literature. Library staff regularly inform about new literary sources and consider requests for acquiring recent literature. The University Library Foundation fully equips students' needs and is structured according to study programmes and research/study areas. The necessary foundation of technological science literature consists of basic course books, guides, dictionaries, and technical literature. Students can use paper copies of accumulated publications in the library, including periodicals (Aerospace Engineering, Aviation World, etc.) providing information on the latest transport technologies and scientific journals "Aviacija," "Transport," "Mechanika," etc. Printed publications ensure access to methodological material via e-mail or online in the Moodle environment. Students who carry out individual work can also contact the relevant lecturer and receive personal consultations by email. The Library Foundation is regularly updated to consider the latest developments in engineering and technology. Students can also use electronic directory databases - http://biblioteka.ktu.edu. The library regularly subscribes to 55 databases.

3.6.2. Evaluation of the planning and upgrading of resources needed to carry out the field studies

The University is constantly investing in infrastructure renovation: a project for the establishment of an Interdisciplinary Prototyping Laboratory Centre KTU M-Lab, which will include an infrastructure

adapted to research, technology, and experimental development, is currently being implemented — a laboratory centre where researchers can carry out their research, develop, produce and demonstrate prototypes serving society. In addition, the University also carries out a project of modernization of the study infrastructure, which includes the creation of an environment attractive to modern education and creativity. Currently, 24 classes are being renovated and adapted to the active learning process of students. The Fabrication Laboratory (Fabrication Laboratory) has also established an engineering workshop, which helps to develop highly qualified electronics specialists, stimulates the creativity of students interested in electronics, and helps them acquire practical skills. Engineering workshops are a platform with modern equipment for developing innovations and inventions: they are designed to produce various products, models, or prototypes, promoting creativity, entrepreneurship, and interest in new technologies.

The University continues to modernise specialised laboratories related to the implementation of aviation programmes: programmes are systematically developed in close cooperation with social partners. The University additionally provides and improves training programmes for sheet metal cutting, bending and riveting, production of aircraft fuel, lubrication, and pneumatic systems pipes and aviation hoses in cooperation with Helicopter Repair Company UAB Helisota Aviation Device Testing Laboratory. In collaboration with aviation sector companies operating in the Kaunas region, such as UAB Helisota, UAB Termikas, UAB DAT LT, "Sportinė aviacija ir Ko," UAB "Kaunas Aircraft Maintenance Services" and UAB "FL Technics" are planned to create laboratory equipment necessary for students specialising in aircraft design/production and maintenance to acquire the essential knowledge and competencies. The University should also consider the possibility of examining aviation students following Part -147, thus facilitating their progress into aviation companies.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. In the valley "Santaka," KTU focuses on researching and studying the potential of up-and-coming fields — sustainable chemistry and biopharmaceuticals, future energy and mechatronics, information and communication technologies, and aviation — alongside which business companies working closely with scientific institutions are formed.
2. Cooperation agreements with the primary aviation industry in the Kaunas region.

(2) Weaknesses:

1. The University should reconsider the possibility of examining aviation students following Part -147, thus facilitating integration into aviation companies.

3.7. STUDY QUALITY MANAGEMENT AND PUBLIC INFORMATION

Study quality management and publicity shall be evaluated according to the following indicators:

3.7.1. Evaluation of the effectiveness of the internal quality assurance system of the studies

The Internal Quality Assurance processes are managed by the programme committees and Head of Department at KTU. For the programmes evaluated, this process is at a high standard, based on discussions during the visit and examination of data collection and survey analysis (in electronic format) conducted by teaching staff on the various modules/ subjects. Students are directly involved in Programme Committees and decision making on the programmes in respect to changes requested through a Faculty Board. Questionnaires on quality issues and improvements are in use and there is a feedback system on dealing with issues in place. The internal assessment and monitoring of the quality in studies are performed by the University Study Quality Committee, the Department of Academic Affairs, the Study Quality Assurance and Development Office and the Faculty Study Committees together with the Fields' Study Programme Committees. The process of the assessment of study programmes provides the opportunities to update the study programmes with regards to the international trends in research and academic development, the market changes and proposals by students, teachers and employers.

The University is engaged with a national evaluation system for students which rates and compares the feedback from students on their respective programmes and range of modules. Some of the improvements made to the programme were partly due to previous questionnaires submitted by students which resulted in new Lecturers appointed, an increase in research activities, laboratory developments and internal and external competitions. Work completed by students is subjected to plagiarism software. Requests for access to laboratory facilities and software are handled on a local level and although some students indicated that the response to some changes were slow, all requests are handled in a professional manner. Students were complimentary of the Careers Mentors, online modules and availability of a wide range of equipment, Interdisciplinary nature of the programmes, erasmus opportunities, competitions and research facilities to support their studies.

3.7.2. Evaluation of the effectiveness of the involvement of stakeholders (students and other stakeholders) in internal quality assurance

Details were provided on the Quality Assurance systems and policies and how they are implemented within the University. The programmes are supported by Employer groups, Alumni and Social partners who provide adequate work placements and services to the programmes and students to support their learning. Programme Committees are in place and students have a voice on Academic Boards whereby they can raise issues of concern on a range of matters that may arise from academic standards, quality of programmes, technical equipment and external activities such as work placements. In meetings with lecturing staff and students, it was evident that all matters from an academic integrity can be addressed via the QA and management structures in place. The students have an opportunity to anonymously express their opinion about the quality of individual modules of their study programme in the "Survey on Study Modules and Teachers" at the end of the autumn and spring semesters each year.

Students' engagement with the Erasmus Scheme, Internships, academic learning programme and engagement with Industry are a successful formula and practice for developing the learning of both national and international students. Students on entry to the programmes are also given recognition for Prior Experiential Learning. Student questionnaires for instance allowed students to evaluate lecturing staff and the organisation of their studies. This provides evidence of good practice in dealing with students in particular, identifying any weaknesses in the studies and supporting staff for further studies. One recommendation worth highlighting is the lack of an external examiner for reviewing examination papers in particular as these examiners play a key role in improving the quality of the assessment processes and facilities through formal reporting mechanisms. In support of students, peer mentoring is particularly well developed for 1st year students, log books are provided and programme handbooks supported by the KTU intranet provides students with relevant data to support their studies and provide a broad awareness of their rights and entitlements.

3.7.3. Evaluation of the collection, use and publication of information on studies, their evaluation and improvement processes and outcomes

Responsibility for the quality assurance of the study programmes are with the departments and academic staff involved in the study process. The results of the feedback are presented each semester

at the Rector's office and KTU Students' Association; later, they are analysed at the Deans' offices of the faculties and the Study Programme Committees.

Information about the academic affairs of the programmes are provided on the University's website. This includes admission standards, tuition fee, details of the modules (core and elective), Credits, International studies and learning outcomes, qualifications awarded and career opportunities. Requirements for internships and useful contact information are also provided. The website also provides the public results of the surveys on studies, the opinion of stakeholders about the relevant competencies in the labour market with regards to each study programme.

Student surveys are published on feedback relevant to the programmes, outlining satisfaction ratings and this is also submitted to a National Evaluation survey system for viewing. The University monitors external surveys and their results are analysed and discussed in the Rector's and the Deans' offices and with students. The University also conducts a teacher survey in which the teachers express their opinion on the quality culture in studies, the development of the study programme and the organisation of the study module and a yearly survey of the employee satisfaction. The results are used for the preparation of a plan of initiatives and actions aiming to create a good experience for KTU employees and ensure the welfare of the community of the University.

3.7.4. Evaluation of the opinion of the field students (collected in the ways and by the means chosen by the SKVC or the HEI) about the quality of the studies at the HEI

University practises strong connection and collaboration with all stakeholders, including the students. These options and feedback are one of the main sources for improvement opportunities. Opinions are gathered via surveys, round table discussions, the assessment of teachers, study programs, study fields, etc. Students have the opportunity to provide their opinions on the quality of individual modules of their study programme via surveys 2 times per year. In addition, via "Student Voice" survey students can express their thoughts regarding quality of teaching, the quality of the organisation of their study programme, the quality of the work of the Study Centres, the social environment, the environment and premises of the University. Students are satisfied with the quality of studies which was expressed during the meeting with them. Students are happy that their feedback is heard by KTU, and they can feel the improvements and changes based on their thoughts, comments and remarks.

Strengths and weaknesses of this evaluation area:

(1) Strengths:

1. High rate of student satisfaction with programmes

(2) Weaknesses:

1. External vetting for assessment at all year levels (not only final year projects)
2. Audit and vetting of the practical contents – especially for the aircraft maintenance.

IV. EXAMPLES OF EXCELLENCE

1. Investment in footprint and resources to deliver the programmes
2. Research Facilities and Innovation Centre to support the programmes in particular
3. Broad range of laboratory activities and R&D equipment (CMM, RAdiography, Mechanics & Dynamics)
4. Leading R&D work in UAVs and drone communications
5. Interdisciplinary nature of the programmes including Science, Mechanical Engineering, IT, Work Based Learning and Management studies.
6. Modules delivery via English
7. High number of staff qualifications to PhD standard allowing for R&D and cutting edge technology engagement with Industry
8. Staff support for students via QA committees, access to resources, extra curricular activities and mentoring.

V. RECOMMENDATIONS

Evaluation Area	Recommendations for the Evaluation Area (study cycle)
Intended and achieved learning outcomes and curriculum	It is recommended that the programme structure and/or learning outcome to some extent do reflect the requirements and routing for aircraft maintenance licensing. A clear pathway should be sign posted across the programme to inform the decision of students towards the selection of the design or maintenance speciality. Programme management needs to address the Credits assigned to the Masters project/thesis to ensure that credits are not provided for duplicate assessments in this.
Links between science (art) and studies	It is recommended to increase the amount of specific knowledge offered to students (courses, but also seminars or other, at-large educational contributions) concerning the two emerging areas of UAV and micro/nano satellites.
Student admission and support	It is recommended that students are supported and guided throughout their career decision-making, as to what direction they better placed (licensing route or design, research and development engineering route)
Teaching and learning, student performance and graduate employment	It is recommended that the requirements of the licensing qualification be made more explicit and well reflected on the learning outcomes.
Teaching staff	It is recommended that a major and continued staff's effort in increasing scientific publications' number and level. HEI should encourage this effort that is requested to have KTU aeronautics sector reaching excellence. It is also recommended that members of academic staff are encouraged and supported with mobility and academic events.
Learning facilities and resources	It is recommended that practical/training facilities be modernised by use of modern equipment, tooling, diagnostic and inspection systems – especially within the avionics programme. And to

	consolidate the practical activities into the licensing requirements (especially for those students who wish to pursue the licensing career).
Study quality management and public information	It is recommended that external examiners are appointed to vet examination content across all level of study, and also vetting on the practical/internship achievement

VI. SUMMARY

Main positive and negative quality aspects of each evaluation area of the study field *Aeronautical Engineering* **at Kaunas University of Technology:**

On behalf of the expert visiting panel, I would like to thank the University staff and management teams for preparing the evaluation documentation and facilitating the visit and addressing most of our queries, questions and addressing our concerns. Kaunas University of Technology has invested substantial funding in its core developments of campus facilities, staffing, student accommodation, research equipment/ activities and educational programmes, including those evaluated by the expert panel. The National Innovation and Entrepreneurship Centre is a very good example of this. Programmes offer opportunities of development for students, lifelong learning and a good standard of academic and practical activities to prepare students for career opportunities both nationally and internationally. For instance, it is evident that the Masters programme contains more Research activities which is desirable at this level. Analysis of the credits for Research studies (Thesis preparation for instance) should be examined to ensure there is no duplication of credits for work undertaken. Modules and programmes are delivered via the English language which strengthen the programmes appeal. There is also good evidence of student mobility within the programmes.

The university is outward looking, designing its activities in line with European Universities through QA activities, Erasmus, work placements, collaborations with Industry and links with international organisations.

The engagement with Industry is of a high standard and offers opportunities to improve R&D and funding partnership activities in the present and future. This can always be improved. One area of improvement is to support staff in attending Conferences to develop their Research work and disseminate new knowledge.

There is a good demand for the programmes overall from prospective students with relevant entry standards. Adequate marketing campaigns take place during the year to promote the programmes, however these can be enhanced via social networks by promoting student activities and QR codes. The University has identified the market needs for the graduates in the national context, however modules should be designed, with support from external bodies to accelerate the time for students to become competent specialists in their field of study related to the Aerospace sector. Otherwise, there may be a drift by graduates to other engineering and technology companies unrelated to this sector.

In the curriculum, the broad range of modules are well received by students and cover the academic standards and requirements of the focused and broad engineering industries in Aerospace Engineering. A greater emphasis on software such as CFD, FEA, modelling, simulation and coding could be delivered as part of the programmes. Work placements/Internships undertaken are an excellent way of developing students' experience, project work and knowledge, however it may require a financial incentive from the industry for students in order to motivate them in completing the work to a higher standard. The Programme Team may also consider introducing Internships in earlier years of the study. An increase in the practical activities for students within the University facilities could be enhanced in relevant modules as highlighted by students, however the expert panel did observe a broad range of equipment and practical workshops on site. External examiners for inspecting set exam work, assignments, checking grades, independently interviewing students and providing feedback on the quality of the programmes each year is a development worth considering by the Programme Leaderships and Faculty Management.

Staff qualifications, teaching environment and facilities seem appropriate for the programme. This will strategically assist the Faculty with Research growth and overseas collaboration going forward. Ethical and QA regulations and documentation are well developed and structured within the University and adhered to.

Expert panel chairperson signature:

Prof. dr. David Kennedy