



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETO
SKRYDŽIŲ VALDYMAS PROGRAMOS (601H41002)
VERTINIMO IŠVADOS

EVALUATION REPORT
OF AIR TRAFFIC CONTROL (601H41002)
STUDY PROGRAMME

at VILNIUS GEDIMINAS TECHNICAL UNIVERSITY

Grupės vadovas: Team Leader:	Laszlo Koczy
Grupės nariai: Team members:	Franco Berneli Zazzera Vasilij Djačkov Andrius Stuknys Paulius Simanavičius

Išvados parengtos anglų kalba
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2013

DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Skrydžių valdymas</i>
Valstybinis kodas	601H41002
Studijų sritis	Technologijos mokslai
Studijų kryptis	Aeronautikos inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Vientisosios
Studijų forma (trukmė metais)	Nuolatinė (5)
Studijų programos apimtis kreditais	300
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Aeronautikos inžinerijos magistras, skrydžių vadovas
Studijų programos įregistravimo data	2010-02-22

INFORMATION ON ASSESSED STUDY PROGRAMME

Name of the study programme	<i>Air Traffic Control</i>
State code	601H41002
Study area	Technological sciences
Study field	Aerospace Engineering
Kind of the study programme	University Studies
Level of studies	Integrated
Study mode (length in years)	Full-time (5)
Scope of the study programme in credits	300
Degree and (or) professional qualifications awarded	Master of Aeronautical Engineering, air traffic controller
Date of registration of the study programme	22/02/2010

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I. INTRODUCTION

The assessment report is based on the material of Self Assessment Report and onsite observations for the study programme *Air Traffic Control* provided by Vilnius Gediminas Technical University. The study programme is carried out mainly by the Department of Aviation technologies and the Air traffic control training unit. The self assessment of Vilnius Gediminas Technical University was carried out during 2012, and the self assessment report is dated on December 2012. The remote evaluation was performed in January-February 2013. The onsite evaluation was carried out by the entire evaluation team on 27th March 2013 on the premises of Vilnius Gediminas Technical University with all concerned parties, including the administration of the University, the staff preparing the SAR (Self Assessment Report), the staff involved in the education and training, the students, several alumni and social partners including prospective employers and the responsible Ministry.

All decisions concerning the final evaluation report have been taken unanimously by the entire team.

II. PROGRAMME ANALYSIS

1. Programme aims and learning outcomes

The aims of the programme *Air Traffic Control* is to educate specialists in Air Traffic Control in an integrated form leading to a degree of master's level. The education of air traffic controllers with higher university degree is in accordance with the policy of the Lithuanian government, especially of the Ministry of National Defence. It may be mentioned that VGTU is the only institution in the Baltic region offering a full scope of aviation related degrees.

The following learning outcomes are defined for this programme (SAR pp. 12-15):

- to convey knowledge of mathematics, physics, fundamentals of electrical engineering and aeronautics;
- to transfer the knowledge of air navigation and flight control;
- to develop the necessary skills in correct aviation in English and Lithuanian;
- to develop abilities for critical solving and formulating questions in the aeronautic science field, both in team work and organized individual work;

- to transfer special skills of understanding the theoretical background of sciences, humanities and social phenomena, further the operation of aircraft systems, air navigation and the organization of air traffic control;
- to develop skills of acquiring theoretical and practical knowledge in air traffic control and aeronautical engineering as a field of science;
- to convey the knowledge to students to understand social sciences, history, philosophy, law, economics and management.

The above aims are clearly and well defined and they are publicly accessible through the programme description and self evaluation reports.

These programme aims and learning outcomes are based on the academic and professional requirements posed by the targeted field. They clearly meet public needs and respond to a demand of the labour market. There is collaboration with the Military Academy in the frame of which a group of the students is also studying at the Academy, parallel preparing for an officer's degree. Other students will be mostly employed by civil aviation companies, and Civil Aviation Administration (CAA) is very supportive of this programme, offering the possibility of graduates being internationally licensed after the necessary additional training practice.

The programme aims and learning outcomes are thus consistent with the expectations towards master level studies in the targeted field, especially as the programme aims also at preparing graduates to carry out research and solve complex issues within the aeronautical field. The level of studies and the level of qualifications offered is in accordance with the programme aims and learning outcomes set down. However, stakeholders have mentioned the fact that a more expressed difference between the programme under evaluation and the *Aircraft Piloting* programme would be advisable, thus providing more specific knowledge to the students. The amount of practical training and professional lectures is sufficient. The intensity of subjects of general basic knowledge leading to a scientifically well founded master's degree might be nevertheless increased by revising the contents of the respective subjects.

The name of the programme, its learning outcomes, content and the qualifications offered are compatible and consistent.

2. Curriculum design

The curriculum meets legal requirements in the sense that it is a combination of the first and second university cycles. The respective credit sums of subjects' unit groups correspond to the required numbers of credits, and the total programme consists of 300 credits. The relevant orders of the Minister of Education and Science are properly cited and presumably followed. According to the SAR the programme curriculum is available at the university webpage and thus publicly accessible.

In the following some detailed comments concerning the course units constituting the curriculum will be given.

Some of the course unit descriptions are too general and repeat the same valid, but not very informative criterion lists. The discussions on site helped somewhat to clarify individual course contents but in some cases the subject course outcomes should be clarified. Apart from the above general remarks the Expert team wants to criticize the following subject contents:

- None of the two mathematics subjects contains any discrete mathematical chapters, especially no graph theoretical and combinatorial basics, nor geometry are included. These areas would be necessary for and could help with properly analysing and solving complex air traffic control situations.
- *Physics* subject is too general and does not offer a proper foundation to specialisation specific important areas, such as aerodynamics, as it was confirmed by several students.
- The principles of digital design, which enable understanding the basics of operation of digital equipment (including the understanding of failures caused by electronic or electrostatic noise and other operational hazards), cannot be found in the course unit description.
- The skills of computer programming and program understanding included in the curriculum are not sufficient, even for preparing the master theses. Because of this the thesis supervisors have to teach additional programming to the students who need that. Sufficient programming skills would be utterly necessary for any scientific research work and partly also for practical work in the field.
- In the subject *General navigation* the course description is too short and the method of teaching and training, further the learning outcomes cannot be clearly identified.
- The main competence in the subject *Fundamentals of flight* is too general and weak. The impression is made by the course description that this is very motley subject without a central concept, this subject needs a revision

- *Air transportation management* subject is too general, it is not clear what competences are transferred within this subject, employers requested more explicit management related knowledge.

Summarizing the above remarks it would be advisable to include some of the areas mentioned above that are missing (entirely or partially) in the curriculum.

While in the programme aims and learning outcomes it is clearly stated that graduates of the programme should possess the necessary skills to carry out scientific (obviously research type) work, most of the subjects point towards offering descriptive knowledge, or practical knowledge and skill, but very little methodological approaches potentially leading towards innovations and knowledge discovery. In case of many subjects (e.g. mathematics, electrical engineering, information technologies, microprocessors and digital systems) a deeper scientific and professional framework could help with this problem. In this respect in the present form although the programme meets the expected level of a master's curriculum it could not be a proper base for PhD studies. Some of the education staff helps with this problem by motivating students with extracurricular activities.

The scope of the programme is sufficient to ensure the learning outcomes in terms of education of good experts in theoretical and practical air traffic control; however it is questionable whether many creative scientists will graduate this programme. It was a general opinion that the programme essentially improved compared to its predecessor programmes, from the practical skills and in depth specific knowledge of the specialisation points of view, which fact was equivocally confirmed by all stakeholders present.

One missing competence is a deep enough knowledge of management aspects of the field. This area should be intensified in the programme.

Some of the up-to-date achievement in science and technology seem to be missing from the curriculum (see critical comments' list).

3. Staff

The staff providing the study programme in general meets the legal requirements. However, 24 of the staff (all lecturers and assistants) hold only a master's degree, among these staff only 3

take part in a PhD programme. Considering that senior staff (full and associate professors) are only 17 this is not a good statistics.

In this particular case it is definitely recommended that a much larger number of university educators (practical trainers exempted) should work on obtaining a PhD. degree. The duration of PhD studies is typically 4-6 years, thus by the time of completing the degrees the above mentioned percentages may be maintained.

The evaluation team learned that VGTU's conditions for enrolling in PhD. studies are rather strict, either requesting high final marks or considerable initial scientific activities by the applicants and often younger staff members do not meet these criteria. It is worth while considering a special agreement between the doctoral board of VGTU and the Institute of Aviation, enabling more intensive enrolment in Ph.D. Studies by the staff of the latter.

The number of full professors is decreasing and the age structure points to the imminent danger of soon having virtually no professors among the staff – unless associate professors carry on with more intensive research and educational activities development.

While studying the publication list of the teaching staff it is clear that a considerable part has never published any papers outside of Lithuania, while almost all other staff members have only been active within the narrow region, mainly in the Baltic States or, in some cases in Eastern-Central Europe. Publications in Western European conference proceedings are extremely rare and overseas conferences do practically not occur in the lists. There are a number of ISI journal publications, but the overwhelming majority is published within Lithuania, the remaining few in broader regional journals. No world leading scientific journal publications can be found at all.

The above facts point to the assumption that most of the teaching staff, even professors are less involved in research activities than it is desirable. The lack of methodological approaches mentioned in section 2 (Curriculum design) of this report is very likely at least partly a result of this situation.

In summary: it is strongly recommended that the majority of junior teaching staff enrol in respective PhD programmes as soon as possible, and all senior staff take part in – possibly international – research and development projects.

Many EU programmes support international mobility within Europe, such visits might be the starting point to being involved in international research projects as well. According to the SAR and the on site impressions the turnover of teachers is minor. This fact is supported by the age structure of the senior staff. There is no mentioning of international visitors since 2011, and even before that the number of annual visitors is very small (1, 1, 4).

The statistics for outgoing mobility provided in the SAR (typically 2 visits per year abroad) is not sufficient. While a few senior staff participates regularly in international committee meetings and conferences the remaining members are virtually excluded from all kinds of international mobility.

4. Facilities and learning resources

The necessary facilities and learning resources are available. There are sufficient lecture rooms, laboratories and training sites, including Kyviskes Airport for real life air traffic control training. The Institute of Aviation recently received a major grant that could be used for renewal of the airfield, for obtaining new equipment including several new aircraft (a part of which, especially two helicopters, will be delivered within this year) and as a result the training facilities at the airfield will meet any expectation.

The available training equipment in the institute is sufficient and up-to-date, including a few rather new and sophisticated simulators. The specific literature needed for the specialisation is completely contemporary and available. European Structural Funds projects made it possible that new course materials were developed in Lithuanian language, based on international sources. This is not entirely true for the basic scientific and introductory subjects, where in several cases literature older than 15-20 years is used (confirmed by the students, and alumni, further by the Annex of SAR).

Summarising the above: the premises are adequate both in size and quality, the teaching and learning equipment and practice sites are sufficient and adequate, teaching materials are accessible.

5. Study process and student assessment

The admission requirements to the course are well-founded, a balanced weighted combination of Mathematics, Physics, Lithuanian and Foreign language grades is requested. Admission interest is sufficient, at the beginning approximately three times the number of available student positions, recently less, but stable and thus a proper selection is possible. The necessary health examination is properly completed for admitted students. Special tests required for air traffic controllers are also requested the final selection is based on the examinations scores, test results and health conditions. The recent change of the sequence in considering the study results and health check is one of the reasons of the decrease in the number of prospective students, but the pool is large enough for selecting appropriate candidates.

Students have a possibility to study with an individual learning programme. They have the opportunity to take courses which they like from the whole university. Furthermore, they are encouraged to do individual work through different course projects, especially in the master thesis project.

The concept of taking part in the integrated Course Project students obtains an opportunity to do individual work that might develop certain basic research skills. The course *Fundamentals of Research and Innovation* gives general methodological help to prepare the final thesis. Nevertheless the modest research activities of many of the teaching staff make it questionable whether these courses transfer enough knowledge and skill to develop any real research abilities. This is evident from the quality level of the master theses most of which are below expectations for this level of study.

Within three years only two students took part in international mobility. The Expert team suggests encouraging more students to take advantage of available mobility programmes (ERASMUS etc.).

Academic support is sufficient, because they have electronic database throughout the university. Some teachers have their personal web pages and there they store information about their courses that is relevant to students.

Social support is good. If students are in need of social support, they can apply and get one. The whole process is governed by the Lithuanian government and the University possesses some additional funds. Those who need it usually also receive it.

The assessment system is approved by the Senate of the University. So it is clear and easy to understand why the student was evaluated this or another way. Moreover, if the student is not satisfied with the evaluation, there is appeal system available at the university.

Alumni have expressed their general satisfaction with the knowledge and skills they had acquired and they stated they were successful in their jobs. Some of them are working for a CAA license. Those working with the Air Force are very positive concerning their competencies obtained.

6. Programme management

The body responsible for programme management and decision making is the Air traffic control study programme committee at departmental level. By the order of the Rector the head of this committee is the head of department. It is advantageous that the director of the air traffic control training unit is a member of the committee. The responsibilities of preparing new study programmes and ensuring the quality of the programmes are clearly allocated to this committee, so is the responsibility to ensure feedback from students, graduates and stakeholders.

There are regular meetings with the stakeholders who express their expectations towards the programme contents and their suggestions are taken into account.

According to the SAR study programmes are continuously improved and renewed based on internal assessment done every other year. The close collaboration with AGAI helps with proper feedback on the quality of the programme. These measures of internal quality assurance might be sufficient.

III. RECOMMENDATIONS

1. Eliminate overlapping in the curriculum. Update the course contents of mathematics, physics, digital design, information technology and management.
2. Include more methodological approaches leading towards the development of research skills of graduates.
3. Focus on scientific development of staff. Enrol more junior teachers in PhD programmes.
4. Start research projects, possibly by applying for national and EU grants, jointly with other universities and institutions. Encourage high level scientific publications by staff members.
5. Increase mobility of both staff and students. Apply for more EU mobility grants, especially with relevant university partners.

IV. SUMMARY

The evaluation team found that the quality of the study programme is essentially good and it is evolving in the direction of continuous improvement. In the next some detail remarks follow.

The following are quality aspects of the programme:

- The programme satisfies real needs of the social partners
- Good specific aeronautics and air traffic control competences taught
- Good and up-to-date real training facilities
- Experienced and well prepared teaching staff in the specialisation
- Efficient feedback from stakeholders
- Good premises, laboratories, equipments, teaching materials, good library.
- Efficient internal and external quality assessment and management.
- Improving programme contents

The following are negative quality aspects of the programme:

- Missing up-to-date areas in basic science courses.
- Missing management competences
- Some of the basic courses' teachers are not properly motivated
- Unclear borderlines between individual subject courses (especially general introductory and historical courses)
- Insufficient preparation for research and innovative work.
- Low percentage of scientific degrees among younger staff.
- Bad age structure, full professors are too old, there is little "backup" with degrees
- Very small participation in PhD programmes, very restricted research and publication activities.
- Very small participation in international mobility (both staff and students)
- The relation between VGTU administration and the Institute of Aviation seems to be not balanced enough (discrepancies in the Ph.D. enrolment needs and possibilities, general subjects' non-specific contents)

V. GENERAL ASSESSMENT

The study programme *Air Traffic Control* (state code – 601H41002) at Vilnius Gediminas Technical University is given **positive** evaluation.

Study programme assessment in points by fields of assessment.

No.	Evaluation Area	Evaluation Area in Points*
1.	Programme aims and learning outcomes	3
2.	Curriculum design	3
3.	Staff	2
4.	Material resources	4
5.	Study process and assessment (student admission, study process student support, achievement assessment)	3
6.	Programme management (programme administration, internal quality assurance)	3
	Total:	18

*1 (unsatisfactory) - there are essential shortcomings that must be eliminated;

2 (satisfactory) - meets the established minimum requirements, needs improvement;

3 (good) - the field develops systematically, has distinctive features;

4 (very good) - the field is exceptionally good.

Grupės vadovas:
Team Leader:

Laszlo Koczy

Grupės nariai:
Team members:

Franco Bernelli Zazzera

Vasilij Djačkov

Andrius Stuknys

Paulius Simanavičius

**VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETO VIENTISŪJŲ STUDIJŲ
PROGRAMOS SKRYDŽIŲ VALDYMAS (VALSTYBINIS KODAS – 601H41002) 2013-06-
11 EKSPERTINIO VERTINIMO IŠVADŲ NR. SV4-197 IŠRAŠAS**

<...>

V. APIBENDRINAMASIS ĮVERTINIMAS

Vilniaus Gedimino technikos universiteto studijų programa *Skrydžių valdymas* (valstybinis kodas – 601H41002) vertinama teigiamai.

Eil. Nr.	Vertinimo sritis	Srities įvertinimas, balais*
1.	Programos tikslai ir numatomi studijų rezultatai	3
2.	Programos sandara	3
3.	Personalas	2
4.	Materialieji ištekliai	4
5.	Studijų eiga ir jos vertinimas	3
6.	Programos vadyba	3
	Iš viso:	18

* 1 - Nepatenkinamai (yra esminių trūkumų, kuriuos būtina pašalinti)

2 - Patenkinamai (tenkina minimalius reikalavimus, reikia tobulinti)

3 - Gerai (sistemiškai plėtojama sritis, turi savitų bruožų)

4 - Labai gerai (sritis yra išskirtinė)

<...>

IV. SANTRAUKA

Vertinimo grupė nustatė, kad studijų programos kokybė iš esmės yra gera ir ji nuolat tobulinama. Toliau pateikiamos kelios konkrečios pastabos.

Programos stipriosios pusės:

- programa tenkina realius socialinių partnerių poreikius;
- lavinamos geros konkrečios aeronautikos ir oro eismo kontrolės kompetencijos;
- geri ir šiuolaikiški realaus mokymo ištekliai;
- patyrę ir gerai pasirengę specializacijų dėstytojai;
- efektyvūs suinteresuotųjų šalių atsiliepimai;
- geros patalpos, laboratorijos, įranga, mokymo medžiaga, gera biblioteka;
- efektyvus vidinis ir išorinis kokybės vertinimas ir vadyba;
- programos turinys tobulinamas.

Programos silpnosios pusės:

- pagrindiniuose studijų dalykuose trūksta šiuolaikiškų sričių;
- trūksta vadybinių kompetencijų;
- kai kurių pagrindinių dalykų dėstytojams trūksta tinkamos motyvacijos;
- neaiškios ribos tarp individualių dalykų (ypač bendro įvado ir istorijos dalykų);
- nepakankamas pasirengimas moksliniams tyrimams ir inovatyviam darbui;
- maža dalis jaunesnio personalo turi mokslinius laipsnius;
- bloga amžiaus struktūra, nuolatiniai profesoriai yra per seni, mažai „pastiprinimo“ su moksliniais laipsniais;
- labai neaktyvus dalyvavimas doktorantūros programose, labai riboti moksliniai tyrimai ir publikacijų rengimas;
- labai neaktyvus dalyvavimas tarptautinio judumo programose (tiek personalo, tiek studentų);
- VGTU administracijos ir Aviacijos instituto santykiai atrodo nepakankamai subalansuoti (neatitinka studentų priėmimo į doktorantūrą poreikis ir galimybės, nekonkretus bendrųjų dalykų turinys).

III. REKOMENDACIJOS

1. Panaikinti studijų plano persidengimus. Atnaujinti matematikos, fizikos, skaitmeninio projektavimo, informacinių technologijų ir vadybos dalykų turinį.
2. Taikyti daugiau metodų absolventų mokslinių tyrimų įgūdžiams lavinti.
3. Daugiau dėmesio skirti personalo moksliniam tobulėjimui. Į doktorantūros programas įtraukti daugiau jaunesniųjų dėstytojų.
4. Pradėti vykdyti mokslinių tyrimų projektus, galbūt pateikti paraiškas nacionalinėms ir ES dotacijoms gauti kartu su kitais universitetais ir aukštosiomis mokyklomis. Skatinti personalą rengti aukšto lygio mokslines publikacijas.
5. Didinti personalo ir studentų judumą. Teikti daugiau paraiškų ES judumo subsidijoms gauti, ypač kartu su atitinkamais universitetais partneriais.

<...>

Paslaugos teikėja patvirtina, kad yra susipažinusi su Lietuvos Respublikos Baudžiamojo kodekso¹ 235 straipsnio, numatančio atsakomybę už melagingą ar žinomai neteisingai atliktą vertimą, reikalavimais.

¹ Žin., 2002, Nr. 37-1341.