



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Vilniaus Gedimino technikos universiteto  
**STUDIJŲ PROGRAMOS *STATYBINĖS MEDŽIAGOS***  
*(valstybinis kodas - 621H75001)*  
**VERTINIMO IŠVADOS**

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**EVALUATION REPORT**  
**OF CONSTRUCTION MATERIALS** *(state code - 621H75001)*  
**STUDY PROGRAMME**  
at Vilnius Gediminas Technical University

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Išvados parengtos anglų kalba  
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Vilnius  
2016

## DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Statybinės medžiagos</i>
Valstybinis kodas	621H75001
Studijų sritis	Technologijos mokslai
Studijų kryptis	Gamybos inžinerija
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Antroji
Studijų forma (trukmė metais)	Nuolatinė (2)
Studijų programos apimtis kreditais	120
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Gamybos inžinerijos magistras
Studijų programos įregistravimo data	2001

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## INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	<i>Construction Materials</i>
State code	621H75001
Study area	Technological Sciences
Study field	Production and Manufacturing Engineering
Type of the study programme	University studies
Study cycle	Second
Study mode (length in years)	Full-time (2)
Volume of the study programme in credits	120
Degree and (or) professional qualifications awarded	Master of Manufacturing Engineering
Date of registration of the study programme	2001

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The Centre for Quality Assessment in Higher Education

## CONTENTS

<b>I. INTRODUCTION .....</b>	<b>4</b>
1.1. Background of the evaluation process .....	4
1.2. General.....	4
1.3. Background of the HEI/Faculty/Study field/ Additional information.....	5
1.4. The Review Team.....	5
<b>II. PROGRAMME ANALYSIS.....</b>	<b>6</b>
2.1. Programme aims and learning outcomes .....	6
2.2. Curriculum design .....	7
2.3. Teaching staff.....	7
2.4. Facilities and learning resources .....	8
2.5. Study process and students' performance assessment .....	9
2.6. Programme management .....	11
<b>III. RECOMMENDATIONS .....</b>	<b>13</b>
<b>IV. SUMMARY .....</b>	<b>14</b>
<b>V. GENERAL ASSESSMENT .....</b>	<b>18</b>

## **I. INTRODUCTION**

### ***1.1. Background of the evaluation process***

The evaluation of on-going study programmes is based on the **Methodology for evaluation of Higher Education study programmes**, approved by Order No 1-01-162 of 20 December 2010 of the Director of the Centre for Quality Assessment in Higher Education (hereafter – SKVC).

The evaluation is intended to help higher education institutions to constantly improve their study programmes 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 prepared by Higher Education Institution (hereafter – HEI); 2) visit of the review team at the higher education institution; 3) production of the evaluation report by the review team and its publication; 4) follow-up activities.*

On the basis of external evaluation report of the study programme SKVC takes a decision to accredit study programme either for 6 years or for 3 years. If the programme evaluation is negative such a programme is not accredited.

The programme is **accredited for 6 years** if all evaluation areas are evaluated as “very good” (4 points) or “good” (3 points).

The programme is **accredited for 3 years** if none of the areas was evaluated as “unsatisfactory” (1 point) and at least one evaluation area was evaluated as “satisfactory” (2 points).

The programme **is not accredited** if at least one of evaluation areas was evaluated as "unsatisfactory" (1 point).

### ***1.2. General***

The Application documentation submitted by the HEI follows the outline recommended by the SKVC. No additional documents were provided by the University before, during, and after the site visit.

### ***1.3. Background of the HEI/Faculty/Study field/ Additional information***

Vilnius Gediminas Technical University (VGTU) is a state higher educational institution. It is one of the largest higher education institutions in Lithuania and is striving to become the leader in offering technology and engineering studies in the Baltic States. The aim of VGTU is to educate highly professional, creative and socially active specialists, who could succeed in both Lithuanian and foreign labour and research markets. The university consists of faculties,

departments, scientific and study laboratories, scientific and academic institutes and centres, library, publishing house, administration and other subdivisions.

The second cycle *Building Materials* study programme has been implemented at VGTU since 2001. Studies are organized in the full-time mode of studies. However, no students have been admitted to the programme since 2012. The recommendations provided by the experts after the external assessment of the Centre for Quality Assessment in Higher Education in 2008 was analysed in the current self-assessment report and the study programme was revised accordingly. The focus of the study programme has now switched to internationalization in order to enable students from neighbouring countries to study in the study programme, i.e. Latvia, Estonia, Belorussia, Russia and Poland. Therefore, implementation of the programme is foreseen not only in Lithuanian but also in English and Russian. The SER analyses implementation of the study programme during the period of 2009/2010 until 2014/2015 academic year when the last cohort graduated.

#### ***1.4. The Review Team***

The review team was completed according *Description of experts' recruitment*, approved by order No. 1-01-151 of Acting Director of the Centre for Quality Assessment in Higher Education. The Review Visit to HEI was conducted by the team on 8<sup>th</sup> December, 2016.

- 1. Prof. Marti Casadesus (team leader)**, *Full Professor, Department of Management, University of Girona, PhD in Industrial Engineering, Spain;*
- 2. Prof. Johan L. Malmqvist**, *Chair Professor, Department of Product & Production Development, Dean of Education at Chalmers University of Technology, Göteborg, Sweden;*
- 3. Dr. Oluremi Olatunbosun** *Head of Vehicle Dynamics Laboratory, School of Mechanical Engineering, University of Birmingham, United Kingdom;*
- 4. Dr. Vincas Benevičius**, *director of the private limited liability company „Žali žali“, Lithuania;*
- 5. Ms. Žiedūnė Sabaitytė**, *student of Aleksandras Stulginskis University study programme Hydraulic Engineering, Lithuania;*

**Evaluation coordinator – Ms. Ina Šeščilienė.**

## **II. PROGRAMME ANALYSIS**

### ***2.1. Programme aims and learning outcomes***

The study programme aims are well defined and clear – to prepare highly qualified and competent production engineering specialists in the field of construction materials including the production and application of construction materials using the newest innovative and energy-saving production technologies. The learning outcomes of the study programme adhere to the description requirements for learning outcomes and are in compliance with Lithuanian Qualifications Framework Level VII qualifications (the second-cycle study programmes). They fall under five categories: knowledge and its application (Z), ability to carry out research (GV), special skills (SG), social skills (CG), and personal skills (AG). However, the classification of some of the learning outcomes is not accurate. The aims and learning outcomes are publicly accessible on the University web site but with great difficulty because it is necessary to first select the list of programmes available in 2012.

The aims and learning outcomes are defined in terms of the knowledge and professional requirements (ability to apply knowledge) for a second cycle programme in Construction Materials. In 2014, the learning outcomes were expanded from 4 categories to 5. However they do not comply with EUR-ACE standards as they do not include personal attributes and design and practice. It is intended that they will be further revised in 2016 to 6 categories. During the revision in 2016, inaccuracies in classification deficiencies in the learning outcomes should be addressed.

The programme was accredited unconditionally on the recommendation of the Expert panel for study quality assessment carried out in December 2008 and relocated to the field of Construction Engineering. The name reflects, very well, the content of the programme and its learning outcomes and the level of the studies is consistent with a second cycle programme.

The SER claims that the masters' programme in Construction Materials is the only one offered in Lithuanian universities and one of the very few offered at foreign universities. However, we found that there is similar study programme 'Construction materials and products' which is oriented more towards the production of construction materials. Nevertheless, it provides a unique opportunity to develop expertise in a field in which there is growing demand for specialists.

## ***2.2. Curriculum design***

The curriculum design meets the legal requirements set by the Ministry of Education and Science for the second cycle study programme. It consists of 120 ECTS credits, from which 39 ECTS are directly related with research. However, only one elective subject worth 3 ECTS is available (in Semester 3) which does not give students enough free choice of subjects.

The modules are spread evenly with 5 modules per semester and the themes are not repetitive.

The content of the subjects is consistent with the type and level of the studies. It is noted that laboratory work over the whole programme is only 75 hours (3%) which is a rather small proportion for a programme which is application based. However, 2 projects are carried out in each semester which may provide further opportunity for practical work depending on the module to which they are associated. Moreover, there is no indication of any industrial placement/internship which would enable the students to gain practical experience. It is therefore not clear that the scope of the practical work of the programme is sufficient to ensure that the practical aspects of the learning outcomes can be achieved.

In the course of studies, master students have to prepare a scientific report, which has to be presented in a scientific conference or seminar, enabling the students to fulfil the relevant learning outcomes (CG1, CG3).

Since the programme is unique in Lithuania, there is a need for the lecturers to keep in close collaboration with the Institute of Thermal Insulation as well as the few foreign universities which run similar programmes to ensure that the content of the programme reflects the latest achievements in the science and technology of construction materials.

## ***2.3. Teaching staff***

The teaching staff meets legal requirements. They are drawn from the teachers of the Faculty of Civil Engineering, Faculty of Fundamental Sciences and Faculty of Mechanics. The programme is delivered by 10 academic staff, all of whom hold doctorate degrees. Of these 4 are Professors, 5 are Associate Professors and 1 is a Lecturer. They have their practical experience in the construction materials industry and maintain a close relation with social stakeholders and are therefore adequate to ensure the learning outcomes. The syllabus of the study subjects is also related to the scientific research or practical activities of the academic staff. The staff-student ratio is very high and adequate to ensure the learning outcomes.

The age profile of the teaching staff is good enough (all between 30 and 60) to ensure sustainability of the programme for the immediate future and turnover is low. All the teachers of the study programme are involved in scientific research financed by both the EU structural funds and national research programmes, the results of which are published in research papers and scientific conferences. The research output of the teaching staff, in terms of publications with impact factor („ISI Web of Science“) over the last 5 years totals 70 papers.

Teachers are required to participate in the research-industrial traineeship at industrial enterprises as well as improve their qualifications by participation in the activities of the committees of Lithuanian Department of Standardization and quality of studies improvement projects including those financed by EU structural funds. Also, teachers participate in scientific conferences, organized at both local and international levels, and in conferences abroad. Erasmus academic staff mobility programme is available to academic staff to leave for teaching visits to foreign partner higher educational institutions. However, only 3 teachers have participated in Erasmus programme in the last 3 years. Also 2 incoming academics gave lectures to students on the study programme in this period.

During the audience with the lecturers it was apparent that some of them lack proficiency in English language which may pose a problem for future internationalisation of the programme.

#### ***2.4. Facilities and learning resources***

Laboratory and research works of the Construction Materials study programme are carried out in Construction Materials Training Laboratory and in the laboratories of VGTU Thermal Insulation Institute. The laboratories are equipped with a wide variety of equipment suitable for laboratory experiments and research of the second-cycle study programme in Construction Materials. These satisfy all the requirements in terms of necessary equipment and materials for the programme, taking the number of students into consideration. The equipment is regularly updated within available resources and the majority of the laboratory premises are currently being renovated.

VGTU library has adequate facilities to meet the needs of the university community in terms of books, publications, e-books and electronic databases. The information about the publications housed in the library funds is available in the computerized catalogue. Readers may work in a pleasant environment at convenient times and the internet reading room is open to visitors 24/7. A reading room is available in each of the faculties. The library's web site provides constantly updated information about the library and its services. In 2015, the university community had



access to 30 data bases. The electronic resources available in the library are adequate and are being constantly updated. The number of electronic books has reached 294 778 titles in 2015 (254 827 titles in 2014), while the number of electronic journals reached 22 851 titles. Both students and the academic staff may access the data bases via VGTU computer network at both the library and all the university buildings or at home, using VPN service.

There is a sufficient number of classrooms for lectures and seminars and computer workstations for students of the study programme. The methodological room SRL I-104 is used for the implementation of Construction Materials and Products second-cycle study programme. A display of construction materials and products is available in the room, as well as other necessary technical documentation including scientific journals published by VGTU on Construction Materials.

Staff of the study programme publishes study books for students of Construction Materials second-cycle study programme. Academic staff can suggest the procurement of the latest publications, relevant for the implementation of the study programme. In the past 5 years literature funds of the Department have been supplemented by 46 new publications.

### ***2.5. Study process and students' performance assessment***

It was very difficult to assess this category as there were no students. The assessment here is based solely on the information contained in the SER, audience with graduates and looking at the final theses.

Admission to the study programme complies with VGTU approved students' admission procedure and admission to university studies requirements. These are updated annually. Applicants are required to have a bachelor's degree in the field of construction engineering or construction technology with specific requirements in terms of prior learning. Graduates of other fields of studies as well as college graduates may be admitted provided they complete bridging studies. Information about graduates of which fields of studies may be admitted to the study programme can be found in the VGTU electronic database on the University web site.

The number of students admitted to the study programme was steady at 9 until 2012 but there have been no admissions since then. The threshold score for admission was also consistently high. The dropout rate has also remained steady at between 22% and 30% mainly due to students being in full employment.

The study programme is to be delivered through a combination of lectures, interactive study methods, seminars, and laboratory works. The students will be required to carry out independent work including tests, home works and course works, preparation for assessments, etc. The volume is regulated to ensure that total effort for every subject matches the volume of the study subject credits. Various teaching methods are to be used in the course of studies including oral presentation, demonstration, discussions, team work, case studies, testing, project work, etc. It is stated the programme includes problem and project learning methods but it is not clear from the course descriptions, which study subjects include such project work. Since there are no students currently this could not be verified. Teachers should use the Moodle platform for disseminating lecture materials as well as for distance teaching and carrying out surveys about the quality of studies. They should also be used for communication forums and to provide practice tests, etc. The study methods as set out in the SER are adequate for the achievement of the learning outcomes.

The graduates remarked that the process of studies is implemented in two different locations (campuses) which involves extra travelling and may not be very convenient.

It is mandatory for all students of Construction materials and products second-cycle study programme to present their research in a scientific conference, usually in the young researchers' conference "Science - the future of Lithuania" (Lit. "Mokslas - Lietuvos ateitis"), organized by VGTU. There is also opportunity to join the implementation of research projects. It is not clear whether students are given the opportunity to participate in mobility programmes since the SER is silent on this issue. None of the graduates interviewed had participated in mobility programmes.

The university provides the usual forms of support to the students of the programme including:

- Presentations on Library regulations, electronic catalogues, online information search, data bases, copying equipment, etc.
- Careers days to help students learn about employment opportunities, meet specialists from well-known organizations as well as lectures and seminars delivered by university graduates, communication with students and recruitment interview simulations.
- Student representation to monitor the students' learning conditions, living conditions at dormitories and representation on the studies committee.

- Social support: students may be awarded incentive scholarships for study results, one-off incentive scholarships and grants from the VGTU and the Faculty scholarships and grants fund, social grants (allocated by State Studies Foundation), etc.
- Individual studies plan on the basis of the approved study programme may be devised for foreign students and students with disabilities.

Students are briefed on the assessment procedure during the first week of each semester. Over the semester, students' reports on independent work are assessed according to the schedule indicated in the study module. At the end of the semester the marks obtained are entered into the examination sheet. However, this information is not available on the web site (for each subject).

Employers state that they need the theoretical speciality knowledge and practical skills of the graduates of the study programme. The demand for graduates of the study programme is acknowledged by the representatives of Construction Industry Association, several business organizations represented during the site visit and by VGTU graduates, who are employed in the construction industry. Positions held by graduates of the study programme include: production managers, sales managers, technical specialists, production quality inspectors, etc.

## ***2.6. Programme management***

The responsibilities for the implementation and monitoring of the programme are clearly allocated: The Study Programme Committee is responsible for the programme implementation, its continual supervision and control. The Programme Committee is subordinate and reports to the Faculty of Civil Engineering Dean and Studies Committee. This Committee is responsible for supervising the study programme (organization of studies syllabus and process, suitability of teachers and their competences, suitability and reliability of facilities and information resources), to identify drawbacks and eliminate them; to organize social partners' surveys, to analyse results, to organize discussions; to prepare self-assessment report and discuss it with social partners, etc.

The study programme is regulated according to university studies programmes and quality assurance process which is based on quality assurance in the European higher education area provisions and guidelines (ESG). VGTU implements the quality management system for all university processes that is in compliance with EUA higher education quality assurance standards requirements. VGTU quality management system documents integrate national and international requirements, necessary to organize and implement qualitative university studies.

The opinion of stakeholders (students, teachers, graduates and employers) is taken into consideration when improvements are to be made to the whole study programme, as well as to individual study subjects or studies material. Social partners (graduates, employers, etc.) have some impact on the improvement of the quality of the programme and its assessment but mostly informally. The most relevant collaboration is with Lithuanian Construction Industries Association (LCIA), the president of which is a member of the study programme committee. The employers are invited to deliver lectures, to provide final thesis topics which are related to solving concrete problems and to participate as members of the degree-awarding board.

It is noted that no students have been admitted to the programme since 2012 and there is no clear evidence that the study programme has been updated in the last 4 years in spite of the claims made above which appear to apply to the pre-2012 period. During the meetings with the administration and SER group, it was stated that plans were being made to internationalise the programme to attract foreign students but there is no evidence of a clear strategy in the last 4 years to reposition and market the study programme effectively, both nationally and internationally, to ensure that enough students can be recruited to the programme.

The general summary of results and the identified issues are discussed by the programme committee, during the meetings with students' representatives, in the academic divisions, at the departments, the Dean's Office, the Rectorate and suggestions for the improvement of quality are made, which leads to decisions on the internal quality of the programme. The internal quality assurance measures are effective and efficient.

Graduates rate the programme highly saying that delivered subjects are relevant and the final theses are related to problem solving relevant to the industry. Employers are also impressed with the quality of the graduates. However, they feel that there is a need to improve capabilities of graduates especially in industrial practice and modern production management systems e.g. lean management and, in especial, acoustics of construction materials.

### **III. RECOMMENDATIONS**

1. Consider revising the study programme to ensure a better differentiation between this programme and the 'Construction materials and products' programme or a unification of the two programmes.
2. Define an action plan, including revision of the curriculum of the study programme.
3. Revise learning outcomes to comply with EUR-ACE standards (include personal attributes, design and practice).
4. Revise the curriculum design to align with the new regulations of 3, 6 and 9 ECTS units. Also increase the number of elective subjects to meet the minimum requirements
5. Ensure that the programme is visible on the web site with all the relevant information on learning outcomes, curriculum and staff profiles.
6. Promote better engagement of staff in international mobility and improvement of language skills, especially English.
7. Endeavour to allocate government funded places to the programme.
8. Improve capabilities of graduates by including industrial practice as well as including, in the curriculum, modern production management systems e.g. lean management.
9. Involve social partners more in the programme e.g. to deliver lectures and formal review of the programme.

#### **IV. SUMMARY**

The main positive and negative quality aspects of each programme evaluation area of the master programme *Construction Materials* at VGTU are presented in the Summary.

##### ***Evaluation area “Programme aims and learning outcomes”.***

The strength of the programme is that the study programme aims and learning outcomes are well defined and clear. The aims and learning outcomes are defined in terms of the knowledge and professional requirements (ability to apply knowledge) for a second cycle programme in Construction Materials. The learning outcomes adhere to the description requirements for learning outcomes and are in compliance with Lithuanian Qualifications Framework Level VII qualifications (the second-cycle study programmes). The masters' programme in Construction Materials provides a unique opportunity to develop expertise in a field in which there is growing demand for specialists as it is one of the very few programmes of its kind offered in Lithuania and at foreign universities.

The weakness of the programme is that the classification of some of the learning outcomes is not accurate. They do not cover personal attributes such as oral communication and group working. Also design and practice is not included. The information on the programme is not publicly accessible on the University web site. There is another programme with a similar name which, although is more oriented towards the production of construction materials, has a significant overlap with this programme

##### ***Evaluation area “Curriculum design”.***

The strength of the programme is that the content of the subjects is consistent with the type and level of the studies. In the course of studies, master students have to prepare a scientific report, which has to be presented in a scientific conference or seminar.

The weakness of the programme is that there is no indication of any industrial placement/internship which would enable the students to gain practical experience. Also, no modern production management systems, e.g. lean management, are included in the curriculum. There is only one elective of 3 ECTS units which does not give students enough free choice of subjects.

***Evaluation area “Teaching staff”.***

The strength of the programme is that the teaching staff meets legal requirements and has the necessary practical experience in the construction materials industry. The syllabus of the study subjects is also related to the scientific research or practical activities of the academic staff. The staff student ratio is adequate to ensure the learning outcomes. The academic staff maintains close relations with social stakeholders. Some stakeholders are involved in the assessment and improvement processes of the study programme. The age profile of the teaching staff is good enough (all between 30 and 60) to ensure sustainability of the programme for the immediate future. All the teachers are engaged in research including those financed by EU structural funds and national research programmes. The research output of the teaching staff, in terms of publications with impact factor („ISI Web of Science“) over the last 5 years totals 70 papers. Teachers improve their qualifications by participation in the activities of the committees of Lithuanian Department of Standardization as well as quality of studies improvement projects including those financed by EU structural funds.

The weakness of the programme is poor participation in international mobility programmes - only 3 teachers have participated in the last 3 years of the programme and only 2 incoming academics gave lectures to students on the study programme in this period. Some lecturers lack proficiency in English language which may pose a problem for future internationalisation of the programme.

***Evaluation area “Facilities and learning resources”.***

The strengths of the programme is that the laboratory facilities used for the study programme are very well equipped including the Construction Materials Training Laboratory and VGTU Thermal Insulation Institute laboratories for teaching and research. Library facilities are excellent with large volumes of printed and electronic books as well as electronic journals. Both students and the academic staff may access the data bases via VGTU computer network at both the library and all the university buildings or at home, using VPN service. There are sufficient study books published by staff of the study programme for students in addition to the latest publications recommended by staff members.

The weakness of the programme is that the process of studies is implemented in two different locations (campuses). There are challenges in obtaining the newest equipment due to by the limited financial resources of VGTU.

***Evaluation area “Study process and students‘ performance assessment”.***

It was very difficult to assess this category as there were no students. The assessment here is based solely on the information contained in the SER, interview with graduates and looking at the final theses.

The strength of the programme is that the admission to the study programme complies with VGTU approved students' admission procedure and admission to university studies requirements. It is mandatory for all students of the study programme to present their research in a scientific conference. The final theses are at a level appropriate for this level of studies. The university provides all the usual forms of social and study support to the students. Employers are very supportive of the programme and feel that there is a shortage of well qualified engineers in the market. Hence employment prospects for graduates are very good.

The weakness of the programme is that no students were recruited in the last 4 years and there is no expectation for admissions in 2017. The university has not allocated any government funded places for the programme in the last 4 years. There is another programme with a similar title 'Construction materials and products' and overlapping content which seems to be more popular with prospective students. There is lack of participation of students in international mobility programmes.

#### ***Evaluation area "Programme management"***

The strength of the programme is that the responsibilities for the implementation and monitoring of the programme are clearly allocated. The employers were involved in assessing final theses. Some of the final thesis topics are related to solving concrete problems provided by the employers. Both graduates and employers value the knowledge that the study programme can provide.

The weakness of the programme is that there is no clear evidence that the study programme has been updated in the last 4 years. The claim that the opinion of stakeholders (students, teachers, graduates and employers) is taken into consideration when improvements are made to the whole study programme seems to apply to the pre-2012 period. There does not seem to have been a clear strategy by the administration in the last 4 years to reposition and market the study programme effectively, both nationally and internationally, to ensure that enough students can be recruited to the programme.

Employers indicate that there is a need to improve capabilities of graduates especially in modern production management systems e.g. lean management.



## V. GENERAL ASSESSMENT

The study programme *Construction Materials* (state code – 621H75001) at Vilnius Gediminas Technical University is given **positive** evaluation.

*Study programme assessment in points by evaluation areas.*

No.	Evaluation Area	Evaluation of an area in points*
1.	Programme aims and learning outcomes	2
2.	Curriculum design	3
3.	Teaching staff	3
4.	Facilities and learning resources	3
5.	Study process and students' performance assessment	2
6.	Programme management	2
	<b>Total:</b>	<b>15</b>

\*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:	Prof. Marti Casadesus
Grupės nariai: Team members:	Prof. Johan L. Malmqvist
	Dr. Oluremi Olatunbosun
	Dr. Vincas Benevičius
	Ms. Žiedūnė Sabaitytė