



CENTER FOR QUALITY ASSESSMENT IN HIGHER EDUCATION

EVALUATION REPORT

STUDY FIELD

MECHANICAL ENGINEERING

At Vytautas Magnus University

Expert panel:

1. Prof. dr. Oluremi Ayotunde Olatunbosun (team leader) *academic*
2. Prof. dr. Jasmina Casals-Terré, *academic*
3. Prof. dr. Mikael Enelund, *academic*
4. Dr. Vaidas Liesionis, *representative of social partners'*
5. Mr. Marijus Ambrozas, *students' representative*

Evaluation coordinator – Ms. Evelina Keturakytė

Report language – English

© *Centre for Quality Assessment in Higher Education*

Vilnius
2021

Study Field Data*

Title of the study programme	<i>Agricultural Mechanical Engineering</i>	<i>Agricultural Mechanical Engineering</i>
State code	6121EX029	6211EX029
Type of studies	University studies	University studies
Cycle of studies	First	Second
Mode of study and duration (in years)	Full-time (4 years) Part-time (6 years)	Full-time (2 years) Part-time (3 years)
Credit volume	240	120
Qualification degree and (or) professional qualification	Bachelor's Degree in Engineering Sciences	Master's Degree in Engineering Sciences
Language of instruction	Lithuanian, English	Lithuanian, English
Minimum education required	Secondary education	University requirements
Registration date of the study programme	01-05-1997	16-05-1997

** if there are **joint / two-fields / interdisciplinary** study programmes in the study field, please designate it in the foot-note*

CONTENTS

I. INTRODUCTION.....	4
1.1. BACKGROUND OF THE EVALUATION PROCESS.....	4
1.2. THE REVIEW TEAM.....	4
1.3. GENERAL INFORMATION.....	5
1.4. BACKGROUND OF STUDY FIELD/STUDY FIELD PLACE AND SIGNIFICANCE IN HEI	5
II. GENERAL ASSESSMENT.....	6
III. STUDY FIELD ANALYSIS.....	8
3.1. STUDY AIMS, OUTCOMES AND CONTENT.....	8
3.2. LINKS BETWEEN SCIENCE (ART) AND STUDY ACTIVITIES	11
3.3. STUDENT ADMISSION AND SUPPORT	13
3.4. STUDYING, STUDENT PERFORMANCE AND GRADUATE EMPLOYMENT.....	15
3.5. TEACHING STAFF	18
3.6. LEARNING FACILITIES AND RESOURCES.....	19
3.7. STUDY QUALITY MANAGEMENT AND PUBLICITY	21
IV. EXAMPLES OF EXCELLENCE	23
V. RECOMMENDATIONS*	24
VI. SUMMARY	25

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 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 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 field SKVC takes a decision to accredit study field either for 7 years or for 3 years. If the field evaluation is negative such study field is not accredited.

The study field is **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 is **accredited for 3 years** if one of the evaluation areas was evaluated as “satisfactory” (2 points).

The study field **is not accredited** if at least one of evaluation areas was evaluated as “unsatisfactory” (1 point).

1.2. THE REVIEW TEAM

The review team was completed according the Experts Selection Procedure (hereinafter referred to as the Procedure) approved by the Director of Centre for Quality Assessment in Higher Education on 31 December 2019 [Order No. V-149](#). The Review Visit to HEI was conducted by the team on *November 27, 2020*. Due to the coronavirus pandemic, the Review Visit was organised online using video-conferencing tool (MS Teams).

1. **Prof. dr. Oluremi Ayotunde Olatunbosun**, Honorary Senior Fellow in the Department of Mechanical Engineering at the University of Birmingham, UK.
2. **Prof. dr. Jasmina Casals-Terré**, Associate Professor (Accredited as FULL PROFESSOR by AQU), Department of Mechanical Engineering, Universitat Politècnica de Catalunya (UPCBarcelonaTech, Spain).
3. **Prof. dr. Mikael Enelund**, Dean of Education, School of MATS (Mechanical, Automation & Mechatronics, Design, Marine and Shipping), Chalmers Tekniska Högskola, Sweden.
4. **Dr. Vaidas Liesionis** LT AB Astra general Manager, Lithuania.
5. **Mr. Marijus Ambrozas**, graduate of Vilnius University second cycle study programme Theoretical physics and astrophysics, Lithuania.

1.3. GENERAL INFORMATION

The documentation submitted by the HEI follows the outline recommended by the SKVC. Along with the self-evaluation report (hereafter – SER) and annexes, the following additional documents have been provided by the HEI before the site-visit:

No.	Name of the document
1.	Course descriptors of first cycle study programme
2.	Course descriptors of second cycle study programme

1.4. BACKGROUND OF STUDY FIELD/STUDY FIELD PLACE AND SIGNIFICANCE IN HEI

Vytautas Magnus University (hereafter – VMU or the University) was established in 1922 and re-established in 1989. It is a classical university based on the common beliefs and values of freedom, openness and dialogue, and orientated towards humanistic culture. The University provides degree studies of all three cycles – bachelor, master and PhD studies which cover a broad spectrum of fields ranging from humanities, social sciences and arts to the fundamental sciences, environmental sciences and biotechnologies.

There are 15 academic divisions at VMU of which the Agriculture Academy (hereafter - AA) is one. Lithuanian Academy of Agriculture (LAA) was a specialized agricultural and forest higher education institution, established in 1924. It became Lithuanian University of Agriculture in 1996 and was renamed to Aleksandras Stulginskis University in 2012. Since January 2019, it is the Agriculture Academy, a part of Vytautas Magnus University.

The Faculty of Agricultural Engineering (a subdivision of LAA) was established in 1946. It welcomed the first students of mechanical engineering study programme the same year. In total, 69 generations of mechanical engineers graduated from this study programme. The Faculty implements studies in the fields of natural resources, mechanics, and transport engineering. The Faculty is situated in Studentų st. 15, Akademija, Kaunas district. Currently (as of September 1st, 2020) the Faculty has 44 teachers and 171 students.

The first cycle study programme *Agricultural Mechanical Engineering* (state code - 6121EX029) and the second cycle study programme *Agricultural Mechanical Engineering* (state code - 6211EX029) (hereafter – study programme, the first cycle and the second cycle study programmes) are prepared by four faculties of Academy of Agriculture. The main executor is the Faculty of Agricultural Engineering. The Faculty consists of three institutes: Institute of Energy and Biotechnology Engineering, Institute of Power and Transport Machinery Engineering, and Institute of Agricultural Engineering and Safety. The main scientific research areas of the Faculty of Agricultural Engineering (related to mechanical engineering) are: provision of quality food and biomaterials for industry; green tribology and nanotechnologies; innovative agriculture and transport technologies; sustainable agricultural, forest, and water management technologies, sustainable utilization of resources.

II. GENERAL ASSESSMENT

Mechanical Engineering study field and **first cycle** at Vytautas Magnus University is given **positive** evaluation.

Study field and cycle assessment in points by evaluation areas.

No.	Evaluation Area	Evaluation of an area in points*
1.	Study aims, outcomes and content	3
2.	Links between science (art) and study activities	3
3.	Student admission and support	3
4.	Studying, student performance and graduate employment	4
5.	Teaching staff	4
6.	Learning facilities and resources	4
7.	Study quality management and publicity	3
	Total:	24

*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 evaluated very well in the national and international context, without any deficiencies;

5 (exceptional) - the field is exceptionally good in the national and international context/environment.

Mechanical Engineering study field and **second cycle** at Vytautas Magnus University is given **positive** evaluation.

Study field and cycle assessment in points by evaluation areas.

No.	Evaluation Area	Evaluation of an area in points*
1.	Study aims, outcomes and content	3
2.	Links between science (art) and study activities	4
3.	Student admission and support	3
4.	Studying, student performance and graduate employment	4
5.	Teaching staff	4
6.	Learning facilities and resources	4
7.	Study quality management and publicity	3
	Total:	25

*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 evaluated very well in the national and international context, without any deficiencies;

5 (exceptional) - the field is exceptionally good in the national and international context/environment.

III. STUDY FIELD ANALYSIS

3.1. STUDY AIMS, OUTCOMES AND CONTENT

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).

(1) Factual situation

Agriculture is one of the most important sectors of Lithuanian economy, contributing 3.5–7.2% of GDP and 12.8% of GDP is generated by agricultural exports (<https://www.vle.lt/Straipsnis/lietuvos-zemes-ukis-117749>, <https://www.laei.lt/?mt=leidiniai&straipsnis=1817&metai=2020>). Moreover, Lithuania ranks highly in the European Union in the marketing and manufacture of agricultural machinery. Therefore, there is high demand for young and innovative specialists for design, manufacturing and maintenance of agricultural equipment in one of the most important industries in Lithuania.

The aim of the first cycle study programme *Agricultural Mechanical Engineering* is “to provide fundamental knowledge of the areas related to the field of mechanical engineering, to develop professional abilities to solve complicated and unpredictable professional activity or learning problems, to work innovatively in agriculture and related areas, to promote individual world-view, critical thinking and to form a member of civil society who independently develops his knowledge and abilities” (SER, section 1.1).

The aim of the second cycle study programme *Agricultural Mechanical Engineering* is “to enable the deepening of knowledge and skills in the field of mechanical engineering, to develop original thinking and specific problem-solving skills needed for research, to prepare for postgraduate studies or for innovation by integrating knowledge from different fields into professional activities” (SER, section 1.1)

Information from the Employment Services of the Republic of Lithuania indicates that 100% of the graduates of the study programmes (2017–2019) are currently employed.

(2) Expert judgement/indicator analysis

Agricultural Mechanical Engineers (AME) are in high demand to meet the needs of the agricultural sector, which is very important to the Lithuanian economy, where companies are involved in design, manufacture, marketing and maintenance of agricultural machinery. The aims and outcomes of the first cycle and the second cycle study programmes conform to these needs by producing high calibre AMEs and this is confirmed by the full employment of graduates of the study field.

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.

(1) Factual situation

The vision of VMU is to be an active, modern, globally recognised, classical university which fosters liberal arts principles, developing creative personalities for both Lithuania and the

world. Its mission is to create a liberal learning environment for individuals, be a reliable international partner providing studies that develop talents and personalities, contribute to local, national and global cultural and academic development. Its strategic direction includes improvement of studies and promotion of graduate employment, increasing internationalisation and increasing its impact on economic and social processes.

(2) Expert judgement/indicator analysis

The first cycle and the second cycle study programmes aims and outcomes help to fulfil the vision and mission by producing high quality graduates who are in high demand both in Lithuania and internationally, and contribute to one of the vital sectors of the Lithuanian economy.

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

(1) Factual situation

For the first cycle study programme, the scope is 240 ECTS while credits for the study field amount to 156 ECTS. Preparation for final thesis and examination is 15 ECTS and internship is 15 ECTS. The contact hours for each study subject are at least 46.7% and individual learning is 53.3% (Table 1, SER 1st Cycle). 72.2% of academic teaching staff are scientists with doctorate degrees and 31.5% are professors (Table 19, SER 1st Cycle).

For the second cycle study programme the scope is 120 ECTS while credits for the study field are 90 ECTS. Credits for studies specified by University or optional studies are 30 ECTS and credits for the Final Thesis are 30 ECTS. The contact hours amount to 23.3% and individual learning is 72.7% (Table 1, SER 2nd Cycle). 96.8% of academic teaching staff are scientists with doctorate degrees and 46.8% are professors (Table 19, SER 2nd Cycle).

(2) Expert judgement/indicator analysis

The field and cycle study programmes comply with the legal requirements for the field and cycles of study.

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

(1) Factual situation

It is claimed in the first cycle and second cycle SERs (Section 1.4) that a good mix of teaching and learning methods such as lectures, presentation of reports, case study, problem-solving, laboratory work, demonstration, project preparation and presentation, information analysis, professional experiences etc., are used to achieve the desired aims and learning outcomes of the field and cycle study programmes.

The Learning Outcomes (hereafter – LOs) for the second cycle study programme are expressed in terms of what the graduate is able to do after completion of the study programme. However, the LOs for each learning area are grouped together rather than expressed individually. The LOs of the study subjects are not always expressed clearly in terms of what the student is able to do on completing the subject and they don't always match the study programme's LOs.

The LOs for the first cycle study programme are not always expressed in terms of what the graduate is able to do after completion of the study programme, while the LOs for the study subjects are often difficult to understand.

Types of assessment listed include a mixture of coursework, presentations and examinations as appropriate to the individual study subject. The Department for Study Quality organizes seminars for teachers, where the diversity of study assessment methods is presented in order to achieve the coherence of study methods, assessment methods and study course results. However, the LOs for the first cycle and the second cycle study programmes and study subject LOs as presented in the study subject descriptions are not written according to descriptions as described in the European Accredited Engineer (hereafter – EUR-ACE) framework for accreditation of engineering studies so it is not clear if the authors of the subject descriptions have been trained to write LOs in generic terms according to the EUR-ACE framework.

(2) Expert judgement/indicator analysis

A variety of teaching and learning methods as well as assessment methods are used, which are compatible with the aims and learning outcomes of the study subject. The first cycle and the second cycle study programmes LOs are not described in generic terms according to the EUR-ACE framework for accreditation of university studies. It is recommended that programme learning outcomes should be expressed in terms of what the graduate is able to do on completion of the study programme. Then the individual subject LOs should be mapped to the study programme's LOs in a matrix.

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

(1) Factual situation

For the first cycle study, the order of the study subjects (Annex 1, SER 1st Cycle) is logical, starting with general university and engineering subjects in the first year, necessary for the student to develop knowledge and cognitive skills in mathematics, physical sciences and humanities. In the second, third and fourth years, the subjects of mechanical engineering are taught in a logical sequence to enable the competences to be developed in a gradual manner, also providing the necessary knowledge and skills for the final thesis work.

For the second cycle study (Annex 1, SER 2nd Cycle), the topic of the research is selected in Semester 1 while the methodology is developed in Semester 2 and the research is carried out in Semester 3. Also, study subjects are selected based on the research topic.

(2) Expert judgement/indicator analysis

The totality and sequence of the study subjects in both the first and the second cycles, including the internship and final thesis, enable the student to develop the competences required of a graduate of the field and cycle of study.

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.

(1) Factual situation

VMU provides students with possibilities to study according to an individual study schedule in order to meet specific learning needs. First cycle students can take individual studies when creating their own individual study plans following Artes Liberales principles in order to acquire additional knowledge and skills necessary to prepare for further academic and professional activities. This includes the opportunity to take freely elective minor studies. The second cycle study programme has a high variety of individualised studies. Students choose the topic of the final thesis which can be selected from four areas: Mechanical engineering, Transport and power machinery engineering, Agricultural machinery engineering and

Manufacturing and stationary storage technology engineering. They then select elective subjects based on the topic of their final thesis which also shapes the direction of their scientific research. In total, students choose 78 ECTS (65%).

Students may also choose full-time or part-time study to suit their circumstances. However, the second cycle part-time studies are being phased out because of the block teaching of study subjects. A Mechanical Engineering study cluster was created in partnership with Social partners and the Ministry of Agriculture of the Republic of Lithuania which has introduced grants for students.

(2) Expert judgement/indicator analysis

There is plenty of scope for students to personalise the structure of field of study according to their personal learning objectives and intended learning outcomes. The ability to choose part-time or full-time study is of particular benefit in a system where many students work while they study.

For the second cycle study programme a block teaching system has been adopted which enables the students to study while working and eliminates the need for part-time study. The creation of the Mechanical Engineering Study Cluster is commendable in that it could make the study programme more attractive to students as it provides grants for students.

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

(1) Factual situation

VMU has a system of evaluating compliance of the final thesis with the requirements of the field and the study cycle by a Final Theses Evaluation Commission (FTEC). The chairman of FTEC is an external expert of the field of study and there is also a social partner member. The titles and summaries of the final theses for both cycles of study indicate that they are within the specialisation of Agricultural Mechanical Engineering.

The first Lithuania Mechanical engineering study cluster, established in cooperation between VMU Agriculture Academy and four agricultural business companies, suggested 18 topics for first cycle theses and 2 topics for second cycle theses for the 2020/21 study year.

(2) Expert judgement/indicator analysis

Evaluation of the compliance of final theses with the requirements of the field and study cycle by the FTEC is good practice, especially as it includes external experts. Suggestion of topics by companies in the Mechanical Engineering study cluster is excellent, as long as their scope is appropriate for the level, and will ensure that the topics are relevant and directly beneficial to the companies.

Recommendations for this evaluation area:

- 1. The study programme learning outcomes should be described in generic terms according to the EUR-ACE framework for accreditation of engineering studies: EUR-ACE® Framework Standards and Guidelines - ENAEE and should be made available on the university website.*
- 2. The individual subject LOs should be mapped to the first cycle and the second cycle study programmes LOs in a matrix.*

3.2. LINKS BETWEEN SCIENCE (ART) AND STUDY ACTIVITIES

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.

(1) Factual situation

Section 2.1 of the SERs (SER 1st Cycle, SER 2nd Cycle) lists a number of important on-going research projects involving staff of Mechanical Engineering as well as grant applications for R&D projects and post-doctoral and doctoral scholarships which are funded by Research Council of Lithuania (RCL). Also, one research project is funded by the EU (ERA-NET). VMU AA funded 17 scientists of the Faculty of Agricultural Engineering with €49,711 for the period of 01.09.2020-31.12.2020 for publication of articles and project application. In the last assessment of the research and development activity carried out by “Government strategic analysis centre” the staff of the Mechanical engineering study field got good evaluation – 3 points (maximum 4 points). The teachers of the first cycle and the second cycle study programmes published 17 (2017), 27 (2018), 22 (2019) articles in the “Web of Science” database with impact factor and 2-3 articles without impact factor. 5-6 articles are published annually in other referred databases.

(2) Expert judgement/indicator analysis

There is evidence that the staff of Mechanical Engineering study field are actively engaged in scientific research and development as confirmed by the Government Strategic Analysis Centre. The number of publications with impact factor by the staff of Mechanical Engineering in the last 3 years is encouraging (averaging 1 publication per person per year) but could be improved. Staff should be encouraged to participate in EU and national research programmes.

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

(1) Factual situation

There is a culture of integrating results of scientific research into study courses whereby teachers use scientific research results in study courses. An example is the final thesis of a second-cycle student “Failure and repair costs of crop harvesters” which became an introduction lecture for the students of the first-cycle studies of machine manufacturing and repair technologies. Staff also organise international scientific conferences where students can present their research or listen to the latest scientific developments. For the second cycle, all students have to publish their research results in scientific papers. This ensures that the second cycle students participate in scientific research of the faculty of Agricultural Engineering and contribute to the scientific output of the faculty.

(2) Expert judgement/indicator analysis

The content of study subjects includes the results of recent scientific research carried out by the teachers. The second cycle students contribute to the scientific output of the faculty through publication of their research.

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

(1) Factual situation

Some of the first cycle final theses are based on scientific research and results can be presented at the annual ‘Young Scientists’ conference. All second cycle students must publish the results of their research in scientific or popular science journals and present at conferences. Evaluation of scientific activity and funding depends on students’ participation

and work in projects. The funding enables advanced second cycle students to do their scientific training practice in the research institutes supported by the RCL. Students can also participate in Erasmus+ programme for research training. There are 7 PhD students in Mechanical Engineering and 4 students defended their theses in the last 3 years.

(2) Expert judgement/indicator analysis

Opportunities are provided for students to participate in scientific activities consistent with their field and study cycle. The policy that all second cycle students must publish the results of their research in scientific or popular science journals and present at conferences encourages excellence in scientific work which also raises the profile of the study programme. This is reflected in the high quality of the second cycle final theses and is a testimony to the efforts of the thesis supervisors.

Recommendations for this evaluation area:

- 1. Researchers should be encouraged to participate in international research collaboration programmes such as Horizon (H2020) or its replacement FP9 as well as national research programmes.*
- 2. Volume and quality of research output is good but there is room for improvement.*

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.

(1) Factual situation

Admission to the first cycle study programme is through the Centralised Admissions Information System (LAMA BPO). Details of the programme and admission criteria available on the university website: <https://www.vdu.lt/lt/study/program/show/294/>. For the second cycle study programme the information is available at <https://www.vdu.lt/lt/study/program/show/316/>

The number of first cycle students (full-time) who signed contracts has been stable at between 10 and 12 since 2017 while the number of part-time students has gone up to 5 in 2020 from 2 in 2019. For the second cycle, the number of signed contracts has been stable at around 11-12 since 2018. Any further drop in numbers could threaten the sustainability of the second cycle study programme.

(2) Expert judgement/indicator analysis

Basic information about student selection and admission criteria is available on the university website. This provides sufficient information for prospective students to make their applications. However, the number of students admitted to the first cycle and the second cycle study programmes (particularly the first cycle) is small. Efforts should be made to attract more students (including girls) to apply to the first cycle study programme by advertisements, social media, school visits, etc. The female lecturers can act as role models to attract female 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.

(1) Factual situation

Evaluation of foreign qualifications is carried out at VMU centrally in the International Cooperation Department based on information provided by SKVC or individual recommendations of SKVC. Every year the rules for admission of foreign citizens to VMU are updated and approved, and they outline the assessment of foreign qualifications, its application, documentation and evaluation. Each year, the University reports to SKVC about the decisions that are made on academic recognition. There is also an established process for the recognition of partial studies by converting the learning achievements evaluated into ECTS according to pre-agreed equivalents.

Recognition of prior non-formal and informal learning are regulated by VMU Study regulations. For the second cycle, as a rule, student's studies are recognized if they have graduated from the engineering science field. Recognition of other fields of study is assessed individually.

(2) Expert judgement/indicator analysis

The procedure for recognition of foreign qualifications, partial studies and prior non-formal and informal learning is well established and seems fair. Review team didn't find information however, whether an appeals system exists. There have been some successes in the recruitment of international students which could help in increasing student numbers and making the first cycle and the second cycle study programmes more sustainable.

3.3.3. Evaluation of conditions for ensuring academic mobility of students.

(1) Factual situation

VMU students are encouraged to participate in academic mobility programmes. This includes Erasmus+ study or internship programme. Graduate students can also participate in this internship programme within 12 months after their graduation. Students can also participate in academic exchange programmes with mobility grants or with scholarships from partner universities to partner countries outside the EU/EEA for a semester or academic year. VMU mobility grants are also available for internships of 1 to 3 months in companies/organizations outside the EU/ EEA. VMU International Cooperation Department and the Faculty/Academy international coordinator provide students with information about studies and placement abroad. The Erasmus+ competition is widely publicised on the VMU website www.vdu.lt, and social media to stimulate the interest of students. Only 4 Masters students (4%) have participated in mobility programmes in the last 4 years while there were 3 incoming Masters students, from Eastern European universities, in the same period, constituting 3% of all the students. Participation by the first cycle students is better at 24 over the last 4 years but it is decreasing. There were 4 full-time bachelor students from India and Nigeria, constituting 5.3% of the whole number of students in the last 3 years.

(2) Expert judgement/indicator analysis

Academic mobility of students is actively encouraged and opportunities are widely publicised. However, participation by students is extremely low for Masters' students (average of 1 student per year in the last 4 years). Participation by first cycle students is much better but decreasing. The number of first cycle international full-time students (5.3%) is quite small. There are no full-time second cycle international students in the last 4 years.

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.

(1) Factual situation

Student social support is coordinated by the VMU Student Affairs Department which administers student social accommodation fees and release from tuition in specific cases based on the social status of the student. Motivational scholarships are based on students' academic achievements. VMU has established patronage scholarships to support student activities along with various other scholarship programmes. Some companies have established scholarships specifically for Mechanical Engineering students. Students can receive psychological counselling free-of-charge at VMU Psychology Clinics in individual meetings or online. Career counselling services are also available to students. Students confirmed that it is easy to access the scholarships for those who qualify.

(2) Expert judgement/indicator analysis

Sufficient financial, academic, social and psychological support is available to students of VMU.

3.3.5. Evaluation of the sufficiency of study information and student counselling.

(1) Factual situation

First year students undergo an induction programme called "Introduction to Studies". The introductory week includes faculty, academic and staff presentations, foreign language options, opportunities to study abroad, Student Council and academic clubs' presentations, information about the use of library resources, campus facilities, etc. Students can receive informational messages through a specially designed portal. The University has a centralized Student Centre to support them by direct contacts or calling, emailing or contacting through social media. VMU Student Affairs Department provides counselling, dealing with student issues related to accommodation, scholarships, benefits, career counselling, etc and teachers are available for academic consultation by students.

(2) Expert judgement/indicator analysis

Sufficient study information and student counselling are available to students of VMU.

Recommendations for this evaluation area:

- 1. The number of students on the first cycle and the second cycle study programmes continues to decrease. If this continues, these study programmes will become unsustainable. Rationalising the electives is one of the ways to increase student/staff ratio. The use of advertisements, social media, school visits, etc. could help in the recruitment of more students, including girls. Recruitment of international students will also help.*
- 2. Improve the first cycle and the second cycle study programmes information on the website. Make it easily accessible in English for international students.*

3.4. STUDYING, 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.*

(1) Factual situation

Study subjects are delivered by “a combination of classic teaching (lectures, laboratory work, practice, seminars) and interactive study methods (guest lectures, case study, group work, presentation of reports, solving of individual tasks and their presentation)”. In order for students to develop the necessary competences, there is a high percentage of individual work (laboratory and practical work, seminars, individual assignments and their presentation), especially at second cycle level. Students are presented with the schedule of individual works at the first lecture and the results are monitored continuously and feedback given through the semester. Graduating first cycle students are invited to study in the second-cycle study programme of Agricultural Mechanical Engineering. Students with the highest competitive points are admitted to studies financed by the state.

(2) Expert judgement/indicator analysis

Students are given details of course subjects in terms of teaching and learning methods, assessment methods, to enable them plan their study and monitor their progress through the semester. Appropriate mixture of lectures, individual work and group work is used in delivering the first cycle and the second cycle study programmes to enable students achieve the intended learning outcomes.

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

(1) Factual situation

Socially vulnerable groups and students with special needs are allowed to study according to an individual study schedule regulated by the university. Socially vulnerable groups (orphans, people with disabilities, students from large families and low-income families) may receive discounts for tuition and/or dormitory fees and scholarships are available for them. University's buildings and equipment are constantly maintained and updated and reserved car parking places are provided to enable easy access for disabled students. Likewise, necessary equipment and furniture are provided for the disabled in the library and classrooms. Data on students with disabilities are integrated into database systems, thus facilitating the learning process for students with disabilities.

(2) Expert judgement/indicator analysis

Considerable effort is made to ensure that socially vulnerable groups and students with special needs have access to study at the university. The integration of data on students with disability into the database system is commendable as it facilitates their learning process.

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.

(1) Factual situation

Processes have been put in place for monitoring of student learning progress. Student's learning achievements are monitored regularly and students themselves are invited to take charge of monitoring their own progress and to take steps to make improvements where necessary. Student progress is monitored in the study information system Studies and Moodle which helps to analyse improvement and reasons of study results (reasons are discussed with vice-dean of the study).

(2) Expert judgement/indicator analysis

A good procedure is in place for monitoring of student learning progress and students are encouraged to take control of monitoring their own progress.

3.4.4. Evaluation of the feedback provided to students in the course of the studies to promote self-assessment and subsequent planning of study progress.

(1) Factual situation

According to VMU Study Regulations, feedback on intermediate work assessment must be given within 2 weeks of submission or in any case before the beginning of exams to help to improve study results. Students and staff confirmed that feedback on intermediate work is provided within 2 weeks and is adequate.

(2) Expert judgement/indicator analysis

The giving of feedback within 2 weeks of assignment submission is good practice.

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

(1) Factual situation

The main sources of information, for evaluation of employability of graduates and career tracking, are the VMU alumni survey, statistics provided by the Employment Service and statistics provided by the Government Strategic Analysis Centre. The VMU AA maintains close contact with their graduates through the Alumni Club and this facilitates the alumni survey and the involvement of alumni in the first cycle and the second cycle study programmes as consultants, experts in study programme committees, etc. The results of the surveys indicate full employment of graduates of the first cycle and the second cycle study programmes and fast progression in their careers with 41% of first cycle graduates and 64% of second cycle graduates holding senior positions 12 months after graduating.

(2) Expert judgement/indicator analysis

The outcomes for graduates are excellent. Their employability is excellent and they are making rapid progress in their careers.

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

(1) Factual situation

The principles of integrity are defined in the VMU Statute, Code of Ethics, the plagiarism prevention procedures of VMU and VMU Study Regulations. There are established procedures for investigation of cases of plagiarism and penalties for violating the Code of Ethics. Plagiarism of students' work is evaluated by Oxford Plagiarism checker Oxsico. No cases of violation of academic ethics, intolerance or discrimination have been reported in the last 3 years.

(2) Expert judgement/indicator analysis

Policies to ensure academic integrity are well defined and the processes put in place for enforcing the codes of ethics are transparent.

3.4.7. 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.

(1) Factual situation

Students have the right to appeal against assessment results or assessment procedures when they disagree with the teacher's assessment and/or identify any violation of assessment procedures. The appeal procedures are laid down in the VMU procedure for appeal investigation, plagiarism prevention procedures and Study Regulations. There were no appeals by any student of first cycle or second cycle study programme in the last 3 years.

(2) Expert judgement/indicator analysis

The appeal and complaints procedures regarding the study process are well defined and transparent.

Recommendations for this evaluation area: none.

3.5. TEACHING STAFF

Study field teaching 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.

(1) Factual situation

There are 34 and 24 teachers involved in the first and second cycles of study respectively. In the Faculty (2019-2020 study years) there were 44 teachers with Full-Time Equivalent (hereafter - FTE) of 30.7: 7.5 FTE of them are working in the mechanical field; 67% of them are working no less than 0.5 FTE; 95% have longer than 3 years' experience; 9.5% are teachers-practitioners; from 3 to 42 years working experience in university (Tables 19 and 17 of SERs respectively, SER 1st cycle, SER 2nd cycle). In terms of qualification and competence they meet all the legal requirements for both cycles. There is a high proportion of Professors and Associate Professors and only a few do not possess a doctorate degree. The number of FTEs has decreased in recent years due to fewer students (71.5 FTE in 2006 and 30.7 in 2020). Workload is based on contact hours (450 hours for professor to 650 hours for lecturer). The qualifications and experience of many of the teachers enable them to participate as experts in the field e.g. on Technical committees of Lithuanian standards board and on editorial boards of local and international journals.

(2) Expert judgement/indicator analysis

The number of teaching staff in the field of study, their qualifications and experience are adequate to deliver the first cycle and the second cycle study programmes and they meet all the legal requirements which are well-founded and transparent. The teaching loads seem reasonable. The age profile of the teachers and the balance between the sexes is not disclosed.

3.5.2. Evaluation of conditions for ensuring teaching staffs' academic mobility (not applicable to studies carried out by HEIs operating under the conditions of exile).

(1) Factual situation

Opportunities are available for academic staff to participate in international mobility programmes such as Erasmus+ both for teaching and training visits. The university and

Research Council of Lithuania (RCL) promote and provide funding for teachers' academic mobility because it is an opportunity for teachers to improve their qualification and research competences, and it opens opportunities for new collaboration. In the period of 2017-2019 the mobility programme was used 43 times by academic staff of the first cycle and second cycle study programmes, with approximately 40% of them using it. The most active members used it 3 to 5 times during this period. High workload is the main reason given by those who did not participate in academic mobility programmes. In the same period, there were 10 incoming staff mobilities. No information is provided regarding the English language skills of the teachers of the first cycle and second cycle study programmes.

(2) Expert judgement/indicator analysis

Opportunities are provided for teaching staff to participate in academic mobility programmes. About 40% of the teachers participated in the period 2017 to 2019 but this can be improved upon. High workload should not be accepted as an excuse.

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

(1) Factual situation

At VMU, teacher professional development is organised under 8 groups of competences: higher education didactics competences, digital competences, research competences, management competencies, foreign language competences, intercultural competences, subject-related competencies and personal competences (regulated by the Description of Procedure for Professional Development at VMU, 2018). Teachers can participate in professional development courses in any of the areas of competence organised by the University as well as ones organised by other Lithuanian institutions or international institutions. Teachers can also choose to pursue professional development possibilities outside the University to develop their teaching and research interests. To cover the costs, teachers can apply for support from their department, research clusters or use Erasmus+ opportunities.

(2) Expert judgement/indicator analysis

Teaching staff are encouraged to participate in professional development courses as well as academic mobility programmes to improve their competences according to their teaching and research interests. This has enabled teachers to improve their professional competences which are beneficial to the first cycle and the second cycle study programmes.

Recommendations for this evaluation area:

Teaching staff are encouraged to participate in academic mobility programmes. However, only 40% of the teaching staff participated in international mobility from 2017 to 2019. This should be improved upon in coming years.

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.

(1) Factual situation

The lecture theatres and rooms are adequately equipped for lecture delivery and with a variety of capacities to accommodate the number of students in each study subject. The

laboratories are well equipped for the study of Mechanical Engineering subjects. Some of the classrooms were refurbished in the recent years. Part of the laboratories in the Institute of Agricultural Engineering and Safety are used for special study courses and laboratory work of the first cycle study programme. The laboratories used for the second cycle studies are equipped with scientific equipment financed by project funds. The capacities of the laboratories are enough for the small numbers of students in the classes. All the buildings have been modified for disabled access. Libraries have equipment for the disabled to create working places for them and classrooms are equipped with the necessary furniture.

Students and teachers have access to a virtual learning environment and collaboration systems – Outlook and Moodle. All the functions necessary for teamwork have been realised in Moodle and Microsoft Teams. VMU IT tools for presenting study information are the Student Portal and the Teacher Portal which provide centralized (based on integrated services) information on the study process to students and staff with the possibility to integrate other information systems.

The libraries are well equipped with 770 working places, 237 computers and 329 connections for personal computers. There are 10 workplaces for users with special needs. The libraries are well stocked with text books as well as up to date journals. Access is provided to 3421 electronic resources (e-books, e-journals, e-conference materials etc.). The library also subscribes to scientific journals and bibliographic databases including Sage Journals Online, Sage IMechE Journals; ScienceDirect, SpringerLink, Taylor & Francis, Wiley Online Library etc.

(2) Expert judgement/indicator analysis

The physical infrastructure available for the study of Mechanical Engineering consists of modern laboratory and research equipment appropriate and adequate for the field of study. The library resources are also excellent and consideration has been given to disabled students to access all buildings and library.

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

(1) Factual situation

Upgrading of computers and purchases of multimedia equipment are done every year according to the resource development plans submitted by the faculties and academies, which they prepare according to the study needs. About 20% of computers are renewed annually. Renewal of information resources is coordinated with the Library by the teachers responsible for the first cycle and second cycle study programmes and individual courses. An interactive document ordering service is installed on the Library website for teachers to make requests for new resources and receive feedback on availability, deadlines and storage of the resources. Planning and updating of the resources required for the study field is implemented by taking into account the changing needs of students and teachers. It is done through the institutes, and faculty funding can be used where there is common need by several institutes. In 2020, €50.000 is dedicated for renovation of equipment.

(2) Expert judgement/indicator analysis

The processes of updating computers, multimedia equipment and information resources are well established and logical. Planning for renewal of infrastructure is done through the institutes in the faculty.

Recommendations for this evaluation area: none.

3.7. STUDY QUALITY MANAGEMENT AND PUBLICITY

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.

(1) Factual situation

The Faculty/Academy Council, the Study Programme Committee (hereafter - SPC), Dean of the Faculty/Chancellor of the Academy and Head of the Department have responsibilities for the internal quality assurance system. The SPC performs internal programme quality assessment and renewal for both first cycle and second cycle programmes. It is responsible for the preparation and implementation of the Programme quality improvement plans. Academic staff, students and social partners are represented on the SPC and its decisions have to be approved by the Head of the Department and the Dean of the Faculty/Chancellor of the Academy. Decisions regarding the quality of studies and their management are based on the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG, 2015), national and VMU legal acts. Due to lack of interest on the part of the students, the student representative on SPC is currently appointed by the Vice-Dean of studies.

(2) Expert judgement/indicator analysis

A robust system has been put in place to implement the quality assurance system of the first cycle and the second cycle study programmes. Due to lack of interest on the part of the students, appointment of student representatives to SPC is made by Vice-Dean. However, this is not ideal. Students should be encouraged to elect their representative to the SPC and other representative bodies.

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

(1) Factual situation

Students are involved in the evaluation of the content of study subjects and quality of teaching through questionnaires at the end of the semester. Surveys of final year students, alumni (one year after graduating), employers of graduates and other stakeholders are also carried out to collect relevant information about the first cycle and the second cycle study programmes. The survey results as well as other information about studies are the basis for the annual analysis of studies performed by the SPC to identify strengths and weaknesses of studies.

(2) Expert judgement/indicator analysis

The relevant information about the first cycle and the second cycle study programmes is collected annually using surveys of students and other stakeholders. This enables the SPC to carry out the internal quality audit and make recommendations for improvement.

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

(1) Factual situation

Various sources of information are used for the internal study quality audit such as student questionnaires, surveys of final year students and social partners, stakeholder discussions, statistical data, etc. The results of teaching quality assessment are used for teaching quality improvement and teacher professional development. Teachers have online access to the survey results and can see the feedback for their study courses. All decisions resulting from the review are publicised to all the stakeholders who provided information. The results are

publicized on the VMU website, emailed to students and teachers, stored in Outlook folders, delivered in social media, and shared by other channels.

(2) Expert judgement/indicator analysis

The process for the collection of information, their use and publication provide for a transparent system of the evaluation and improvement processes and outcomes.

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.

(1) Factual situation

The opinions of students collected by questionnaires and EXIT survey of final year students about the quality of the studies are analysed by the SPC and used for improvement of the first cycle and the second cycle study programmes. Students have a voice on the SPC to ensure that their opinions are taken into account in improvement of the first cycle and the second cycle study programmes.

(2) Expert judgement/indicator analysis

A good system has been implemented to evaluate the opinion of students about the quality of the field studies.

Recommendations for this evaluation area:

Students should be encouraged to elect their own representative to SPC (and indeed to other representative bodies) rather than being selected by the Vice-Dean.

IV. EXAMPLES OF EXCELLENCE

The policy that all second cycle students must publish the results of their research in scientific or popular science journals and present at conferences encourages excellence in scientific work which also raises the profile of the study programme. This is reflected in the quality of the final theses and is a testimony to the efforts of the thesis supervisors.

V. RECOMMENDATIONS*

1. The study programme learning outcomes for both first and second cycle study programmes should be described in generic terms according to the EUR-ACE framework for accreditation of engineering studies: EUR-ACE® Framework Standards and Guidelines - ENAEE and should be made available on the university website. The individual subject Learning Outcomes should then be mapped to the Study Programme Learning Outcomes in a matrix.
2. Use advertisements, social media, school visits, etc. to help in the recruitment of more students, including girls. Also, improve the first cycle study programme information on the website to make it easily accessible in English for international students.
3. Encourage researchers to participate in international research collaboration programmes such as Horizon (H2020) or its replacement FP9 as well as national research programmes. Also improve volume and quality of research output.
4. Improve the first cycle and the second cycle study programmes information on the website and make it easily accessible in English for international students.
5. Encourage students to elect their own representative to SPC (and indeed to other representative bodies) rather than being selected by the Vice-Dean.

*If the study field is going to be given negative evaluation (non-accreditation) instead of RECOMMENDATIONS main **arguments for negative evaluation** (non-accreditation) must be provided together with a **list of “must do” actions** in order to assure that students admitted before study field’s non-accreditation will gain knowledge and skills at least on minimum level.

VI. SUMMARY

The following is a summary of the findings of the review team based on the Self-Evaluation Reports and the interviews with the university administration (senior management and faculty administration staff), staff responsible for the preparation of the SER, teaching staff and stakeholders (students, alumni, employers, social partners).

The review team gives a positive evaluation to the implementation of the *Mechanical Engineering* study field and first cycle and second cycle at the Vytautas Magnus University with all areas of evaluation assessed as good or very good.

The following are the key strengths of the *Mechanical Engineering* study field and first cycle and second cycle as assessed by the review team:

- Vytautas Magnus University (VMU) is the only university in Lithuania providing training for Agricultural Mechanical Engineers (AME) and the graduates are in high demand to meet the needs of the agricultural sector, which is very important to the Lithuanian economy, where companies are involved in design, manufacture, marketing and maintenance of agricultural machinery. The graduates enjoy full employment and rapid career progression.
- The first cycle and the second cycle study programmes are rather specialised as they deal specifically with agricultural machinery and the curriculum includes some interesting and innovative subjects at Master's level including remote control of agricultural machines and autonomous machines.
- The Teaching staff, Alumni and Social Partners are highly committed and very supportive of the first cycle and the second cycle study programmes, the university and its management.
- For the second cycle study programme a block teaching system has been adopted which enables all students to study while working and eliminates the need for part-time study.
- A Mechanical Engineering study cluster was created in partnership with agricultural business companies and the Ministry of Agriculture of the Republic of Lithuania which has introduced grants for students as well as enabling final thesis topics relevant to these companies to be proposed.
- It is evident that the staff of Mechanical Engineering study field are actively engaged in scientific research and development as confirmed by the Government Strategic Analysis Centre and the doctoral and post-doctoral scholarships funded by the Research Council of Lithuania. The Faculty of Agriculture also funds the publication of articles and project application. Nonetheless, researchers should be encouraged to participate in international research collaboration programmes (e.g. H2020) and in national research programmes.
- Students are very satisfied with the first cycle and the second cycle study programmes and think their teachers are very helpful and responsive to their feedback.

The review team would like to highlight the following example of good practice of the *Mechanical Engineering* study field and the second cycle:

- All second cycle students must publish the results of their research in scientific or popular science journals and present at conferences. This encourages excellence in scientific work and requires much effort on the part of their supervisors. However, it is reflected in the high quality of the final theses and raises the profile of the study programme.

The review team would also like to highlight some areas for possible development of the *Mechanical Engineering* study field and first cycle and second cycle, none of which are critical enough for lower grade of evaluation:

- The Learning Outcomes for the first cycle and the second cycle study programmes and study subjects, as presented in the study subject descriptions, do not currently conform to the EUR-ACE framework for accreditation of university studies. They should be revised and expressed in terms of what the graduate will be able to do at the end of the study programmes.
- There are very few international students on the specialised Agricultural Mechanical Engineering study programmes (first and second cycles) whereas they may be very attractive to students of countries where such a study programme does not exist. Therefore, there is scope for attracting more students by raising the international profile of the study programmes through the research activities of the staff and students. Also, by improving the first cycle and second cycle study programmes information on the website and making it easily accessible in English.
- There is a need to increase the number of students, especially for the first cycle study programme. Efforts should be made to improve publicity of the study programme among both boys and girls by advertisements, social media, open days, school visits etc.

Expert panel signatures:

Prof. dr. Oluremi Ayotunde Olatunbosun (team leader) *academic*

Prof. dr. Jasmina Casals-Terré, *academic*

Prof. dr. Mikael Enelund, *academic*

Dr. Vaidas Liesionis, *representative of social partners'*

Mr. Marijus Ambrozas, *students' representative*