



STUDIJŲ KOKYBĖS VERTINIMO CENTRAS

Kauno technologijos universiteto
**PROGRAMOS *MAISTO MOKSLAS IR SAUGA*
(621E40001) VERTINIMO IŠVADOS**

EVALUATION REPORT
OF *FOOD SCIENCE AND SAFETY (621E40001)*
STUDY PROGRAMME
at Kaunas University of Technology

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DUOMENYS APIE ĮVERTINTĄ PROGRAMĄ

Studijų programos pavadinimas	<i>Maisto mokslas ir sauga</i>
Valstybinis kodas	621E40001
Studijų sritis	Technologijos mokslų
Studijų kryptis	Maisto technologijos
Studijų programos rūšis	Universitetinės studijos
Studijų pakopa	Antroji
Studijų forma (trukmė metais)	Nuolatinės (2 metai)
Studijų programos apimtis kreditais	120
Suteikiamas laipsnis ir (ar) profesinė kvalifikacija	Maisto technologijų magistras
Studijų programos įregistravimo data	2010 m. gegužės 3 d., No.V -635

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of the study programme	<i>Food science and safety</i>
State code	621E40001
Study area	Technological Sciences
Study field	Food Technologies
Kind of the study programme	University studies
Study cycle	Second
Study mode (length in years)	Full time (2 years)
Volume of the study programme in credits	120
Degree and (or) professional qualifications awarded	Master in Food Technology
Date of registration of the study programme	May 03, 2010, No.V -635

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The Centre for Quality Assessment in Higher Education

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I. INTRODUCTION

An International Review Panel, organized by the Centre for Quality Assessment in Higher Education (SKVC), has evaluated the Master of Science study programme *Food Science and Safety* (MSFSS; state code - 621E40001) offered by Kaunas University of Technology (KTU) since the academic year 2008/2009. The evaluation was based on the submitted Self Evaluation Report (SER) and related documentation, a site visit on April 29, 2014, and subsequent discussions within the Panel. The Programme has been evaluated in detail in 2011 by a national panel. The current review panel took into account previous recommendations when evaluating this study programme in spring of 2014. Recent changes in the programme included the abolition of the two specializations within the programme, significant reductions in the programme content dealing with food chemistry and analysis, and significant increases in the range and number of elective subjects and research projects. The most recent changes in the programme, made in 2013, focussed on changes associated with the presentation of the course in English, and related internationalization of the curriculum. The International Review Panel commends the strategic objectives underlying the current dynamic development of the MSFSS programme, and has formulated a number of comments and recommendations, which the Panel hopes will be of assistance in achieving these broader objectives.

The following evaluation of the Programme was prepared by the International Review Panel led by Prof. Dr. Anna Maraz, Corvinus University, Hungary, and included Prof. Dr. David McDowell, University of Ulster, Northern Ireland, Prof. Dr. Eero Puolanne, University of Helsinki, Finland, Dr. Vidmantas Paulauskas (social partner), State Food and Veterinary Service, Lithuania, and Mr. Darius Varanius (student member), Vilnius University, Lithuania.

II. PROGRAMME ANALYSIS

1. Programme aims and learning outcomes

The main aim of the programme is to prepare MS graduates “to develop, implement and manage food technologies...formulate tasks for the food control and analysis...and work in a wide spectrum of food industries as well as research institutes”. The programme aims to supply graduates who will be able to carry out research, technological, consulting and managerial work in a range of food industries, and enterprises, including catering services, food analysis and food control. The study programme is also designed to provide students with an effective and

extended experience in research and research related activities, and develop their interests and competencies to proceed, should they wish, to third stage (PhD) research studies.

The programme aims to meet the academic and professional requirements required of graduates managing and researching quality and safety aspects of food production, a rapidly expanding, complex, and challenging area of science-based industry, technology and research. There are many master programmes in this field running in Europe and other parts of the world, belonging either to the agricultural or the engineering/technological areas. The Panel concluded that the MSFSS programme is well suited to being delivered within a University of Technology such as KTU, and that the programme will benefit from the very strong background in basic natural sciences, provided by the long established BS at KTU.

The programme aims are well formulated, clearly defined and appropriate for what is a quite complex master programme, combining food quality, safety, and modern food technologies with research intensive training and activities. At the same time the aims are quite diverse and ambitious, seeking to produce graduates who can work across a wide range of food enterprises and activities, as food technologists, specialists in food control and analysis, as well as researchers.

The Panel received documentation in relation to the position of the MSFSS in comparison with other food related masters programmes in Lithuania (Veterinary Food Safety (MSVFS) and Food Product Development (MSFPD)). The Panel understands that the MSFSS is much wider than the MSVFS in terms of programme content and graduate employment. The Panel noted that the MSFSS shares some aims with the MSFPD, in training specialists to develop, implement and manage food production activities. However, during the visit, the Panel learned of some significant differences between these two programmes, in that MSFSS graduates have greater knowledge and competencies in relation to food analysis and food control, underpinned by a deeper knowledge and practice in food science. Nevertheless the Panel concluded that clearer separation of the aims, content and likely employment opportunities for the MSFSS and the MSFPD would be beneficial to national and international applicants, and to potential employers and social partners.

The Panel received extensive documentation outlining the intended learning outcomes and competencies of the MSFSS study programme. This documentation presented too many learning outcomes, which were difficult to evaluate, and may present challenges in relation to tracking

and assessing student and group progress through the study programme. For example, the majority of each of the study subjects (including the electives and research projects) have more than 10 learning outcomes. The Panel suggests that it would be beneficial to all concerned if this complex matrix was simplified, to have fewer, more meaningful (less than 10) learning outcomes.

The Panel learned that an EU funded project, carried out in 2010, had established the considerable demand within Lithuania for food specialists in a broad range of processing, manufacturing and service areas. The Panel noted that more recent consultations between KTU and the University's extensive network of food enterprise contacts, have confirmed similar and increasing demand for such specialists, across the range of Lithuanian food enterprises, and industries. This fits well with wider European and international trends in this field, because the production of safe and healthy food becomes an increasingly important priority in national and international terms.

Recent data indicates that 80% of the MSFSS graduates have been employed in food processing and catering companies, food control institutions and governmental food related activities. In addition, since the academic year 2009/2010, 14% of the MSFSS graduates have progressed into PhD programs at KTU. However the provided information does not allow to differentiate data on current demand for MS graduates from data on current demand for BS graduates in the market therefore value of the degree, in terms of direct entry into employment, becomes unclear. The Panel suggests that separate management information be collected and considered within the annual programme reviews of the MS and BS programmes, to more effectively inform on-going developments and adjustments to these two separate, different, programmes.

The programme aims and the learning outcomes are effectively delivered within the provided curriculum, with particular reference to the provided scheme of core and compulsory subjects. It is, however, less certain that the programme's structure is providing all the necessary knowledge and competencies for all the students undertaking the MSFSS. While the core and compulsory subjects are well aligned with the intended learning outcomes, the Panel considered that the full set of intended learning outcomes could be more effectively achieved, if some of the currently elective study subjects were transferred into the core and compulsory group (discussed in detail in the following chapter). The currently significant number of elective study subjects, while offering considerable flexibility and student choice, may allow students to make choices which mean that they risk not achieving all of the wider programme learning outcomes.

Furthermore, food quality and food safety are of equal significance in the food industry, which means that food quality should perhaps have a higher profile within the programme. The Panel recognizes that food quality is already widely and deeply involved in several study subjects, and food quality management does feature in some programme aims and learning outcomes. Nevertheless, this element still seems to be under represented in the programme. The Panel would also like to suggest that there may be some benefits in having “quality” within the programme title. Such a change may also increase industrial interest in the programme and its graduates. Many national and international food companies now expect graduates, and especially MS graduates to be familiar not only with the food safety assurance/management but also with food quality assurance/management. The Panel considered that omission of the term “science” from the name of the programme (to avoid the title becoming unwieldy) would be unlikely to reduce the “value” of the Programme as deep scientific knowledge is implicit in master programmes. However, replacing “science” with “quality” is merely a suggestion, and the Panel understand that decisions of this type have significant internal and external implications, which the teaching team and the University authorities would wish to consider in discussion with their network of industry and social partners.

2. Curriculum design

The Programme is in line with the general requirements of masters level courses, i.e. a 2 year programme earning a total credit value of 120, with not more than 5 subjects are studied during the semester, and preparation of final thesis and its defense comprising 30 credits. The curriculum structure is appropriate to the stated aims of combining core issues in food science and technology, with deeper consideration of specific emerging topics and challenges in newer aspects of food science/safety. This twin track approach is facilitated by the design of the programme, with a compulsory/core provision undertaken by all students, supplemented with student-selected elective study subjects.

The Panel received and considered detailed information on the wide range and nature of core and elective study subjects within the programme. The Panel discussed the programme content with the teaching team, and concluded that there is little repetition among study subjects, that overall balance among module subject areas appears appropriate, and that the suite of study subjects is likely to achieve the stated programme objectives.

The learning methods to be used, including the early introduction of individual/small group based research studies, are very appropriate for programmes at this level and are likely to provide an effective means of achieving the broad course objectives, i.e. training of food technologists with deeper knowledge of food safety and R&D in the food area, as well as preparation for PhD studies in the area of food science.

The scope, content, flexibility of curriculum documentation, and the knowledge, research and communication skills to be developed and applied within the programme are sufficient to ensure the production of graduates possessing the target capacities and characteristics i.e. “masters capable of developing, implementing and managing food technologies in food enterprises“– and „able to formulate and resolve tasks in food control and analysis, by applying appropriate knowledge in food science“.

The content of the programme has been recently reviewed, leading to a number of changes which reflect recent developments and challenges in this discipline. Specific changes include reductions in the amount of food chemistry and analysis, expansion of courses in food quality and safety management, new product development, biotechnology, functional foods and food supplements, along with the introduction of new courses in food safety and toxicology, and food safety legislation.

The number of elective subjects has also been increased, aiming to provide the students with a deeper knowledge in modern food technology and opportunities. The range of elective subjects has increased the opportunities for students to learn and experiment with the recently established infrastructure of small scale technological and semi-pilot equipments. The Panel also noted the increased number of elective study subjects related to the application of modern analytical methods in food safety and quality, as well as the considerable number of credits devoted to research related projects.

These are significant and valuable changes. However the Panel also has some specific curriculum suggestions in relation to the above general observation about making some of the current electives compulsory, to ensure that the programme aims will be achieved. These include moving the currently elective study subjects on Novel Methods of Food Processing, New Food Product Development and Food Plant Sanitation, into the core of the study programme. The Panel agreed that the knowledge and expertise to be gained in these study subjects are becoming essential in achieving the overall programme aims, and preparing graduates to work effectively

in modern food industries. This is because management and operational systems such as HACCP are seen as standard in many sectors of the food industry. In the future, national and international trends in food science and safety will place even greater emphasis on the methodology and execution of food safety risk analysis. The teaching team may wish to consider increased content, or the development of a separate course in this area, to ensure that graduates continue to achieve the overall programme aims, and meet industry expectations in this area. Similarly, the teaching team should recognize increasing national and international requirements for graduate competence in modern microbiological food analysis, and consider expansion of the curriculum in that area, again to ensure that graduates can operate effectively in the development, implementation, and control of modern systems for food sanitation, food analysis and control. The Panel welcomed the intention to establish a food centre at KTU, and noted that this initiative should be of considerable value in achieving the above suggested developments.

During discussions the Panel sought the views of the teaching team in relation to meeting increasing industry and societal concerns in terms of wider safety and environmental (impact) aspects of food enterprise activities. While the Panel were assured that these are dealt with in appropriate study subjects as part of a “whole food chain” approach, the Panel noted that these aspects were not immediately evident in study subject titles, or content.

The Panel members were provided with details of the mechanisms for identification/allocation of research projects. However, relatively little information was available on the learning outcomes, or format, of these projects, although it is clear that they are very closely related to the final thesis. Some thought could usefully be given to the potential for some of the earlier research projects to contribute to wider programme outcomes e.g. working as a member or leader of a group, and/or group learning in other courses within the programme. Similarly, some of the time currently allocated to research projects could be reallocated to provide group work developing an understanding of some of the wider business aspects which impact on food safety and quality development and delivery.

The Panel was not able to establish the overall rationale for having a series of smaller research projects, which were eventually summarized within the (larger) final project. While some of the earlier projects did involve introduction to some aspects of the wider processes of designing and executing research related activities, the Panel receive very little information on the structures and progression within this series of activities, apart from teaching team comments about the final thesis summarizing the results of earlier research projects. The Panel had some concerns

about the relative lack of details on these activities, especially as they constitute a very significant component of the overall study programme. Therefore the programme team may wish to consider defining research projects 1, 2 and 3 and more clearly separating their topics and aims from the topics and aims of the final thesis.

The Panel agreed that practical training/placement of master students is increasingly important, and noted discussions within the teaching team to extend this activity beyond to target two months. Such experience in production companies or food controlling governmental and private institutions is a key element in establishing and developing student competence, and should be extended where possible.

3. Staff

The legal requirements concerning the involvement of professors in the teaching activity are fulfilled. Altogether 15 full time active teachers are involved in the programme and 14 of them belong to the Food Science and Technology Department. Five professors, 6 associate professors and 4 lecturers having PhD degree are organizing the program and performing the teaching activity at MS level. All the professors and certain associate professors also participate in PhD training.

The Panel received documentation which confirmed that the qualifications of the teaching staff are adequate to ensure achievement of the programme learning outcomes. In general, the professional and educational profile of the staff covers the appropriate range of food science and technological disciplines. This satisfactory condition has been achieved by efforts within KTU to continually update the knowledge and competence in the teaching team. The Panel suggest that further developments in the number and levels of qualifications of staff may be necessary to effectively support course developments in some of the newer parts of the programme, such as microbiological food analysis, food quality and risk assessment. These enhancements are likely to be facilitated by the construction of a new food research institute within the KTU Campus.

The numbers and discipline ranges of the permanent teaching staff are sufficient to achieve the programme learning outcomes, and are usefully supplemented in a number of applied fields by staff from other parts of the university, part-time teachers from other institutions, speakers from industry and visiting international lecturers.

The technical and administrative staff of the Department supports the implementation of the programme. During the visit staff members explained that more technical staff would be needed to maintain and operate the growing range of complex items of equipment, being used in MS research and teaching.

The staff of the Department form a very enthusiastic and purposeful community, who continue to seek means of enhancing the Programme in relation to national and international developments in food safety and quality. A number of new staff members have been employed to bring new experience into the master program and to ensure its viability.

Visiting professors from abroad, mainly within the framework of ERASMUS contracts, regularly deliver guest lectures, which provide opportunities for students to improve their foreign language competence and professional qualifications.

The panel noted that current turnover of teachers is minimal and does not have any negative impact on the quality of the programme. Some teachers retired around 2000, and a number of new and/or young teachers have been employed since then, enhancing teaching team experience in a number of the new research and educational areas being developed within the Department. This means that the students engage with an appropriate range of academic experience and expertise during their studies. PhD students are also involved in the teaching activity, especially in the research projects.

The assessment and qualification system within the KTU ensures the constant improvement of the teachers' qualifications. For example, the Panel noted that KTU operates a Centre of Distant Learning to help teachers to acquire knowledge and expertise on the presentation of teaching material, and become more familiar with new interactive methods of teaching, monitoring and student evaluation. During the visit the Panel were briefed on current usage of the new e-learning platforms (e.g. Moodle), and noted plans to increase the individual and general use of such systems within the study programme.

The scientific basis of the master programme is very strong, The research income of the Department is quite high and is increasing. The Panel noted evidence that staff members are project leaders or members of international and national projects. Such projects make significant contributions to the quality and delivery of the programme, for example by enhancing the infrastructure and research potential necessary for the implementation of the research and

laboratory practices, and providing relevant, “cutting edge” topics for final degree projects. The Panel noted the considerable contributions being made by some professors, not only to the continuous improvement of the education, but also in finding new resources to support research and further develop international collaboration. The Panel suggest that greater engagement of the wider teaching team in such national and international research and development projects could enhance the student learning process.

The Panel noted highly creditable levels of research and publication activities within the teaching team, although this is not the case right across the team. The Panel suggests that, especially at masters level, it is important that most staff, including new/younger staff become engaged in appropriate research at national and international levels, to ensure that their teaching remains current. The Panel noted evidence of staff involvement in international and national conferences.

All the teachers involved in the Programme have improved their qualifications during the evaluation period by teaching abroad, on at least one occasion, and for at least 1 week. Some staff have engaged in more and/or longer periods of experience in other countries. This is creditable, but more of the team should aim to extend the durations of such educational and/or research visits abroad, as an important means of keeping up to date with international trends in research and teaching. The Panel note the range of international collaborations between the Department and several EU and non-EU (including transatlantic) universities as an appropriate means of increasing staff exposure to these international trends.

During the site visit staff members indicated that they were generally satisfied with the support offered by the University to facilitate staff participation in conferences, international mobility programs and distant learning, although it is clear that the initiative to undertake such activities remains with individual teachers. Monetary and other conditions for sabbatical leaves are very limited, and a number of staff would welcome further support in this area. The Panel suggests that efforts should be made to encourage wider staff engagement in this important aspect of staff development, to ensure continuing quality and currency of the study programme.

The Panel noted that students’ surveys showed that the students are very satisfied with the teachers’ performance. The view was strongly and frequently confirmed during discussions with current and present and graduated students during discussions during the site visit.

4. Facilities and learning resources

During the visit the panel members were able to view a wide range of special teaching and research facilities and labs and equipment. Wider learning support facilities, i.e. lecture rooms, computing, audio, video, and related IT/Web based/intranet provision have been recently reviewed and updated within the last five years.

The space set aside for specialist practical student activities, i.e. teaching, research, small scale/pilot simulation and sensory analysis laboratories, is generally sufficient to facilitate the delivery of the planned curriculum, bearing in mind the suggested student cohort numbers, i.e. lectures – 25 students, practice – 16 and laboratory works – 8 students. However, this is a demanding course in terms of necessary equipment and practical/laboratory space, which means that any future increases in student numbers could require significant increases in these resources.

The class room and related facilities are clustered i.e. within 100 m. The provided details on general purpose rooms, laboratories, departmental library, and support services are more than adequate for the named programme. Seating areas for graduate and PhD students are available, and 2 additional teaching labs became available at the end of 2010.

The Panel learned that the laboratories to be used for the FSS program are located with the Centre for Food Science and Technologies Competence. The Panel received little or no information about this centre, although comments during the visit made it clear that there are likely to be considerable positive interactions between the students and staff involved in the MSFSS, and the Centre for Food Science and Technologies Competence.

The Panel considered documentation outlining the major analytical, pilot scale and simulation equipment available to the study programme, and concluded that the provision was sufficient and appropriate to deliver the indicated curriculum.

Although the general levels of provision of laboratory and related facilities were observed to be good, there may be pressure on space and facilities in some areas, bearing in mind the competition among student groups, and other programmes within the Department, to access these specialist resources.

The Panel considered that there is insufficient space for student group work, which is becoming an increasingly important aspect of many international masters level programmes.

The Panel noted the availability of considerable amounts of equipment for chemical and physical analysis of foodstuffs, and was particularly impressed with the range and scope of pilot scale facilities available to students. However, the Panel saw less evidence of equipment appropriate for teaching and research associated with the development and application of novel food processing technologies. Bearing in mind the clear programme emphasis on the design of new food products and the application of novel technologies, methods and instruments in resolving problems in food safety and quality, steps should be taken to improve provision in these areas, to match the very good equipment and facilities currently available in more established study subjects within the programme. The Panel noted the recent provision of small capacity production line for simulation/modelling of processes, which are likely to be of particular value in individual/small group higher level studies, in line with higher level studies.

The Panel received a general list detailing the specialist laboratory facilities, which are shared with a number of other programmes, including the Food Science and Technology BS programme. The MSFSS places greater emphasis in on safety/sensory quality, rather than chemical analysis, and may therefore require additional specific facilities for safety/sensory/quality analysis. The Panel considered that, in terms of planning and development, the needs of the MSFSS should be considered separately. However, the Panel did not received any specific documentation on the current or future microbiological facilities to support the MSFSS. During the site visit the Panel members were able to view the currently available microbiological laboratory which is clearly too small to support the amount of microbiology that is in the MSFSS programme. The Panel members were informed that new larger microbiological facilities will be made available in the near future, and that the microbiological facilities available to the students will also be enhanced by the establishment of the Centre for Food Science and Technologies Competence. These changes would need to be made as soon as possible.

As well as the direct curriculum related activities outlined above, the University & Department have in place a range of additional mechanisms to support and encourage student participation in relevant aspects of professional practice, including early engagement in research processes, scientific societies, Department wide seminars, and student mobility programmes, (although participation in the latter seems relatively limited). The indicated move away from “examination

only” assessment will provide further scope for student practice in relation to assignments, projects etc.

The Panel noted that teaching materials are available within the Central University Library, with more specific course related material provided within the Departmental Library. Other relevant sources include the KTU bookshop and in-house produced books and intranet provision of lecture slides, lectures summaries, descriptions of laboratory works, course papers and homework assignments. Such resources need to be constantly updated by teaching staff. Bearing in mind the move to offer the programme in English, the teaching team may wish to increase the attraction of the programme by further reducing the number of indicated key texts and additional literature which are currently not in English. Within such a review, the teaching team may wish to ensure that all of the current recommended English texts are at an appropriate (masters) level.

Comments during graduate and social partner meetings confirmed the demand for more practical training and experience. The Panel fully endorses the current student and social partner views, that this aspect of the program is important, and, if at all possible, should be extended. The Panel members were pleased to subsequently learn that the teaching team plans to increase the amount of time that students will spend working in companies and outside laboratories, and that discussions are underway in relation to more specific contracts for such internships.

The Panel noted the commitment of the staff team to encourage and facilitate student engagement in international collaboration as part of their masters program. The Panel was pleased to note the numbers of students and staff involved in international collaboration, as demonstrated during discussions with students, graduates and social partners. Success in this area was further confirmed by documentary evidence of Erasmus facilitated international research collaboration, and student collaboration in international research journal publications.

Students spoke very positively in relation to individual and group staff efforts to help students in identifying and effectively using the full range of provision for student learning, practice, and professional development. They did, however, express some concerns in relation to the numbers of copies of key texts within the library, in comparison to the number of students wishing to access such texts at peak times. They were keen to express their appreciation of staff efforts to reduce such pressures by preparing “concepts” papers.

5. Study process and student assessment

The admission requirements are clear and transparent, and are appropriate for a Master degree in Food Technology.

The programme has proved attractive, with intake cohort numbers ranging between 10 and 15 in the years 2009 to 2014. The lowest enrolment was in 2012/2013 when 10 students were admitted.

The organisation of the study programme appears reasonable. The studies are organized as a 16 week long process consisting of spring and autumn terms, according to the schedule publicized in the University website and study programme publication in compliance with individual plans and the syllabus. Working load per week and term is distributed reasonably. The syllabus is publicized no later than five days before the start of the term in the Faculty's bulletin board and Student Union website. The examination syllabus is publicized two weeks before the beginning of the examination session.

Documentation received by the Panel indicate the availability of staff e-learning platforms such as the KTU-operated Centre of Distant Learning. None of the staff who met the Panel indicated that they used this facility, although students indicated that they had been involved in several elements of distance learning based study. The Panel was therefore unable to establish the uptake and application of staff e-learning methods in relation to the MSFSS teaching team. Such platforms (e.g. Moodle, Blackboard, etc.) are increasingly used, and can be very effective in making learning resources from around the world available to students, and in reinforcing/representing potentially difficult lecture materials. The Panel suggests that the use of Moodle should be extended to all subjects, not only as an information repository, but also in order to contribute to students' individual and collaborative learning. Staff should be trained and encouraged to develop their own technological, pedagogical and methodological teaching skills, and to provide students with the wider benefits of such systems.

The main written assignment in the FSS programme is the research thesis which summarizes the research results obtained during the studies. As such, there is no formal requirement that the research work be presented/published as a paper in peer-review journals. However, the grading criteria of the thesis strongly encourage students to work on cutting-edge projects and aim to publish their results. By participating in the Department's research, the students can more easily and effectively prepare their final research reports, and take part in important research related

activities – such as research presentation in the “Technorama” exhibition (held by young scientists), write scientific papers and present their research at a traditional students’ tripartite conference “Chemistry and chemical technology” organized by Vilnius University, Vilnius Gediminas Technical University and Kaunas University of Technology. Students are also encouraged to present research results at the annual Baltic States scientific conferences (FoodBalt) which is hosted in turn by Lithuania, Latvia and Estonia. The Panel was informed that supervisors encourage every student to be involved in at least one international publication. The Panel members concluded the MSFSS students are provided with an appropriate range of opportunities, and encouragement, to become involved in research, and that the students welcomed these opportunities. The Panel had the opportunity to read a number of papers and theses produced by MSFSS students, and noted these to be generally current, relevant and interesting contributions to knowledge. However, the Panel was somewhat concerned to note that none of the selection of presented theses included statistical analysis of generated data. This may be an artifact of the particular theses presented, but does seem unusual, as most MS theses and research papers in food science and safety might be expected to include appropriate statistical analysis.

The Panel noted that KTU student individual study plans are designed to be able to recognize and incorporate study elements completed abroad, and that 52 % of FSS Programme students participated in the ERASMUS mobility program between 2009 and 2012. Such rates of mobility are well ahead of targets set by EU Ministers of Education (that 20% of all graduates should have studied abroad by the year 2020). The Panel commended such levels of participation and noted Departmental plans to further increase student participation in such beneficial activities.

Consistent dissemination of information on study forms, financing, aims and objectives, assessment of results, alternative subjects, syllabi, mobility, etc. are ensured by regular updating of the University, Student Representation and Chemical Technology Faculty websites, as well as by annual publications of “KTU Study Programs” and “On Studies and Free Time” journals. Information is also presented in the books “Undergraduate Studies”; "Master Studies"; "Ph.D. Study Program”; “International Programs” and “KTU student guide”. The Panel noted that all these publications were available on the KTU website. The Panel also noted that the teaching team and other members of the Department introduce students to potential employers during the annual “Career Day” events. The Panel noted that KTU organizes a comprehensive mentoring programme, including start mentors, academic advisors, career mentors, tutors and research mentors. The Panel members suggest that it could be valuable for these mentors to be fully involved in the study processes.

Documents provided to the Panel, and observations during the tour of facilities confirmed that students are provided with good levels of social and academic support. The students' culture and social support is provided by the Office of Students' Affairs in close cooperation with the Dean's Office and Student Representation of the Faculty. Psychological assistance is the responsibility of the KTU Centre for Academic Advance.

The Panel also noted that students have the opportunity to access a wide range of social and support activities, including 20 sports teams and 15 amateur art groups, and that non-local resident students can live in the University dormitories.

The students reported that the teaching team, and other staff of the Department, are supportive, approachable and helpful to students in learning and integrating the wider aims of the teaching programme. They also reported that the study processes were enriched by the teaching and research associated contributions from the range of visiting/international lecturers.

The criteria of achievements' assessment are publicized at the start of the term, and provide information on the assessments for each individual subject (knowledge and skills), individual work assignments, i.e. colloquiums, seminars, group works, individual tasks, etc., and the approaches used in relation to for example weighted coefficients. This approach should reduce the pressure on students of final examinations, and provide greater opportunities to evaluate a wider range of student skills and competencies.

The Panel members were informed of a range of feedback mechanisms used to confirm the achievement of learning outcomes. These formal and informal means of review include student, graduate and social partner questionnaires and round table discussions. The Panel noted that such reviews have led to a number of positive and effective changes in course content and delivery mechanisms. The efficiency and effectiveness of these processes was subsequently confirmed during subsequent discussions with very positive and supportive groups of students, graduate and social partners. The annual graduate surveys confirmed the overall high levels of success, and the destinations of graduates, with around 80% of graduates in appropriate employment and significant number of graduates progressing to PhD programmes at KTU.

Overall, the Panel concluded that KTU is ensuring an adequate level of academic and social support, a view that was reinforced during the Panel's discussion with very positive and supportive groups of students, graduates, employers and social partners.

6. Programme management

Provided documentation and discussions during the visit allowed the Panel to confirm that the study programme is well organized, and managed. There are clear and universally understood channels of decision making, course monitoring and communications at all levels.

In relation to new courses, higher level programme policy and management decisions are effectively derived and actioned in line with relevant Government, University and Faculty structures and guidelines. Major strategic decisions such as study programme direction and renewal are made by the KTU Senate, and actioned by the Vice Rector of Studies and Study Program Committee (SPC). After initial approval, study programmes are prepared within the appropriate faculty, principally by teaching teams, in collaboration with students and social partners, and then subjected to internal and external evaluation prior to programme launch. The Panel received evidence of the existence of effective structures, at each of the above levels for the formal review, and where appropriate revision and refinement, of the MS study programme.

In relation to established study programmes, the Panel noted that significant study programme related documents, along with accumulated and routinely updated statistical data about student and teacher/researcher activities, and other relevant information, are formally examined within the annual study programme review specified by standard University procedures. The Panel noted that all study programmes are subject to more comprehensive review every three years, a process which includes, among other things, formal reevaluation and updating of modules by the teachers involved in their delivery.

The Panel considered the presented cycle of study programme development and review provides a rational and robust mechanism for the gathering and evaluation of "internal" and "external" information, which informs and supports significant decisions about the study programme.

The Panel received documentation from, and had discussions with, the Faculty, Department, teaching team, students, industry and social partners in relation to study programme quality assurance. The Panel noted the wider Faculty and University level student feedback systems, including those involving the Strategic Planning and Quality and Planning Systems, Assessment

Commission, and Faculty Administration.

Less formal feedback from students and social partners is also collected during face-to face discussions. The Panel considered that such less formal information from students, employers and social partners is still important, and were pleased to note plans to capture this information onto a rolling database, and to include it in future formal reviews. That said, the Panel concluded that current means of gathering feedback to inform formal reviews are functioning well, providing useful information, and are widely appreciated by students, industry and social partners.

The Panel noted that the MS Programme was subject to a very detailed evaluation by a national expert panel in 2011. The Panel considered the suggestions and outcomes from that review which, as has been already mentioned, included substantial changes in study programme structure and contents.

The Panel recognized the value of such changes, and the major commitment within the Department to continue to fully integrate such changes within the overall programme. During the site visit, the Panel received a number of very positive comments from social partners and from graduates, in relation to these valuable changes in the Programme.

In overall terms, the Panel concluded that the programme management system for the MS is working well. It is effectively supporting and monitoring the development of the MS study programme, in prepared graduates with the necessary characteristics and capacities to drive forward industry and research in support of food technology based businesses and related research in Lithuania.

The Panel wishes to express their thanks for the very positive and open approach taken by staff at all levels within KTU, as well as the numerous positive and constructive contributions by students, graduates, industrial and social partners, all of whom made it clear that they were pleased to be associated with this well established, popular and nationally significant study programme. Their professional approach to the discussions contributed significantly to what the Panel hopes was a productive and effective evaluation event.

III. RECOMMENDATIONS

1. The Panel recommends that the programme management teams and teachers should more clearly define the differences between the aims, content, competencies and potential career paths of the two food-related master programs (MSFSS and MSFPD).
2. The Panel recommends a reduction in the defined number of learning outcomes and greater differentiation between course study elements in this respect.
3. The Panel recommends collection and separate consideration of information on the demand for, and destinations of, MSFSS graduates, to inform more appropriate management and planning decisions.
4. The Panel recommends expansion of the core of the programme by making a number of the food quality and safety related courses compulsory, which would ensure that all graduates are adequately prepared in these (nationally and internationally) increasingly important areas of food science and safety practice.
5. The Panel recommends review/modification of the nature, content and learning mechanisms in some of the early research projects, to provide students with opportunities to develop their understanding of relevant business aspects of the food production, safety and quality chain. It is also advised that the aims and topics of the early research projects and the final thesis project are more clearly defined and separated.
6. The Panel recommends that the Department consider the provision of additional space for group discussion and team work.
7. The Panel recommends that the additional equipment and related resources necessary to deliver the more recently added elements of the masters programme, should be made available as soon as possible.
8. The Panel recommends that the Department should specifically prioritize the planned refurbishment/expansion of the microbiological facilities available to this programme, along with the provision of related molecular microbiology equipment.
9. The Department should encourage and facilitate a better balance of teaching and research across the teaching team.
10. The Panel recommends that the teaching team should review listed key texts and additional literature to ensure that
 - sufficient specified textbooks are available at peak times;
 - more recommended texts are in English and that they are at masters level.

11. The Panel recommends that careful consideration should be given to the suggestion of changing the name of the programme to “Food Quality and Safety” or “Food Science, Quality and Safety”.

IV. SUMMARY

The aims of the programme are well formulated, clearly defined and indicate a complex and research intensive master programme. Some of the aims are, however, rather ambitious, especially in terms in practical terms, and overlap with the KTU MS programme Food Product Development (FPD). Both courses, students, social partners and industry would benefit from improved definition and differentiation of the aims, and contents of these programmes.

The programme aims meet the academic and professional requirements as well as the increasing demand for graduates to enter public and the private sector employment.

The content of the programme has been recently reviewed, leading to a number of changes which reflect recent developments and challenges in this discipline. The programme aims and learning outcomes are well supported, and likely to be achieved through much of the curriculum. However, the programme would be stronger, and could more effectively achieve its aims, if some of the current elective study subjects were drawn into the compulsory core of the programme undertaken by all students. The programme would also benefit if more time was made available for group discussions and team work, which are increasingly relevant to graduate research and industry activities. Expansion of the practical training elements undertaken by students in the food industry, and related surveillance, development and research organisations, would further enhance graduate performance and progress.

The qualifications of the teaching staff are adequate to deliver the learning outcomes, across the full range of food science and technological disciplines. Staff of the Department of Food Science and Technology represents a very enthusiastic and purposeful community, who are actively seeking to adapt and improve their programme to address national and international developments and challenges in food safety and quality. Contributions by guest lecturers from the industry and international lecturers provide additional opportunities for students to improve their professional qualification and foreign language competence.

Most of the teaching staff participates in international mobility programs, but more staff participation in educational and/or research visits, and for longer periods, should be encouraged, especially as the programme is now offered in English.

Research projects contribute significantly to the quality and impact of the programme, by enhancing research infrastructure and relevance. The research and publication activities of several teaching staff members are a significant strength of the programme, but efforts should be made to draw more associate professors and lecturers into appropriate research projects.

Staff members are satisfied with the conditions offered by the University, but would welcome improvements in the provision of sabbatical leave.

Current students and graduates students are very satisfied with the staff teaching expertise and efforts, and they appreciate the supportive and approachable approaches taken by staff.

The assessment and qualification system within the KTU are appropriate to support continuing improvements in staff development, and qualifications.

The teaching and learning facilities within the Department are generally sufficient to facilitate the delivery of the planned curriculum. However, less equipment is available to support teaching and research associated with the application of novel food processing technologies. Similarly, the indicated development of improved and expanded microbiological laboratory facilities and equipment provision are essential to successfully achieve the programme aims.

The admission requirements are clear and the organisation of the study programme is reasonable. Involvement of students in research projects gives them the opportunity to publish the results in scientific journals and to present at a range of student conferences.

E-learning platforms are increasingly used by the students, but it appears that the use of these systems is more limited among teaching staff. More staff training and activity in this area is necessary to ensure the appropriate application of these systems within the programme.

The Programme is subject to regular formal evaluation and review, which encourages ongoing improvement and enhancement of study subjects and wider aspects of the curriculum.

V. GENERAL ASSESSMENT

The study programme *Food Science and Safety* (state code – 621E40001) at Kaunas University of Technology is given **positive** evaluation.

Study programme assessment in points by evaluation areas.

No.	Evaluation Area	Evaluation Area in Points*
1.	Programme aims and learning outcomes	3
2.	Curriculum design	3
3.	Staff	3
4.	Material resources	3
5.	Study process and assessment (student admission, study process student support, achievement assessment)	3
6.	Programme management (programme administration, internal quality assurance)	4
	Total:	19

*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. dr. Anna Maraz

Grupės nariai:
Team members:

Prof.dr. David A. McDowell

Prof.dr. Eero Puolanne

Dr. Vidmantas Paulauskas

Mr. Darius Varanius

**KAUNO TECHNOLOGIJOS UNIVERSITETO ANTROSIOS PAKOPOS STUDIJŲ
PROGRAMOS MAISTO MOKSLAS IR SAUGA (VALSTYBINIS KODAS – 621E40001)
2014-07-17 EKSPERTINIO VERTINIMO IŠVADŲ NR. SV4-403 IŠRAŠAS**

<...>

V. APIBENDRINAMASIS ĮVERTINIMAS

Kauno technologijos universiteto studijų programa *Maisto mokslas ir sauga* (valstybinis kodas – 621E40001) vertinama teigiamai.

Eil. Nr.	Vertinimo sritis	Srities įvertinimas, balais*
1.	Programos tikslai ir numatomi studijų rezultatai	3
2.	Programos sandara	3
3.	Personalas	3
4.	Materialieji ištekliai	3
5.	Studijų eiga ir jos vertinimas	3
6.	Programos vadyba	4
	Iš viso:	19

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

2 - Patenkinamai (tenkina minimalius reikalavimus, reikia tobulinti)

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

4 - Labai gerai (sritis yra išskirtinė)

<...>

IV. SANTRAUKA

Programos tikslai gerai suformuluoti, aiškiai apibrėžti ir nurodo, kad magistrantūros programa yra kompleksinė ir orientuota į mokslinius tyrimus. Tačiau kai kurie tikslai yra pernelyg ambicingi, ypač susiję su praktika, ir dubliuojasi su KTU siūloma *Maisto produktų technologijos* (MPT) magistro studijų programa. Šių abiejų programų tikslų ir turinių tikslėsnių apibrėžimas ir atskyrimas būtų naudingi ir studijų programoms, ir studentams, ir socialiniams partneriams, ir pramonei.

Programos tikslai atitinka akademinis ir profesinius reikalavimus bei augantį poreikį absolventams užimti darbo vietas viešajame ir privačiame sektoriuose.

Programos turinys buvo neseniai peržiūrėtas ir buvo atlikta nemažai pakeitimų, kurie atspindi šioje disciplinoje įvykusius pokyčius ir kilusius naujus iššūkius. Studijų programos turinys atitinka programos tikslus ir studijų rezultatus, o programos sandara sudaro galimybę juos

įgyvendinti. Tačiau programa būtų stipresnė ir jos tikslai būtų pasiekiami efektyviau, jeigu kai kurie pasirenkamieji studijų dalykai būtų padaryti privalomais visiems studentams dalykais. Naudinga būtų skirti daugiau laiko diskusijoms grupėse ir komandiniam darbui, kadangi tai aktualu absolventams užsiimant mokslinė ir profesine veikla pramonės sektoriuje. Padidinus studentų praktinio mokymo užsiėmimų skaičių maisto pramonėje ir susijusiose stebėjimo, plėtros ir mokslinių tyrimų organizacijose, studijas baigusieji studentai galėtų pasiekti geresnių darbo rezultatų ir toliau tobulintų savo kompetencijas.

Dėstantysis personalas yra tinkamai kvalifikuotas studijų rezultatams pasiekti visose maisto mokslo ir technologijos disciplinose. Maisto mokslo ir technologijos katedra turi labai entuziastingą ir į tikslą orientuotą personalą, aktyviai siekiantį pritaikyti ir tobulinti savo programas, kad šios geriau atitiktų šalies viduje ir pasaulyje vykstančius pokyčius ir naujus iššūkius maisto saugumo ir kokybės srityje. Kviestinių dėstytojų iš pramonės sektoriaus ir dėstytojų iš užsienio paskaitos suteikia studentams papildomų galimybių tobulinti jų profesines žinias ir užsienio kalbos mokėjimą.

Didžioji dėstančiojo personalo dalis dalyvauja tarptautinėse judumo programose, tačiau skatintinas dėstytojų aktyvesnis dalyvavimas švietimo ir (arba) tyrimo komandiruočių veikloje bei išvykimas ilgesniems laikotarpiams, ypač pradėjus dėstyti šią programą ir anglų kalba.

Mokslinio tyrimo projektai reikšmingai prisideda prie programos kokybės ir poveikio stiprindami mokslinio tyrimo infrastruktūrą ir aktualumą. Keletas mokymo personalo narių dalyvauja mokslinio tyrimo ir leidybos veikloje, tuo reikšmingai stiprindami programą, tačiau daugiau pastangų derėtų skirti siekiant įtraukti didesnę skaičių docentų ir lektorių į atitinkamus tyrimų projektus.

Personalą tenkina Universiteto siūlomos darbo sąlygos, tačiau pageidautų patobulinti kūrybinių atostogų suteikimo tvarką.

Dabartiniai studentai ir absolventai yra itin patenkinti dėstytojų profesinėmis žiniomis ir pastangomis, jie vertina personalo teikiamą paramą ir norą padėti.

KTU taikoma įvertinimo ir kvalifikavimo sistema užtikrina nuolatinį deramą personalo kompetencijų ir kvalifikacijų tobulinimo procesą.

Katedroje esantys mokymo ir mokymosi ištekliai yra pakankami programos vykdymui. Tačiau Katedra turi mažiau įrengimų, reikalingų mokymui ir moksliniams tyrimams, susijusiems su naujoviškų maisto gamybos technologijų taikymu. Panaši situacija ir su nurodytomis mikrobiologijos laboratorijos priemonėmis ir įranga, kurios privalo būti gerinamos ir plečiamos, kad būtų užtikrintas sėkmingas programos tikslų įgyvendinimas.

Stojimo reikalavimai yra aiškiai išdėstyti ir studijų programos organizavimas yra deramas.

Studentų įtraukimas į mokslinių tyrimų projektus suteikia jiems galimybę skelbti gautus rezultatus moksliniuose leidiniuose ir pristatyti įvairiose studentų konferencijose.

Studentai vis aktyviau naudojami e. mokymosi platformomis, tačiau atrodo, kad to paties negalima pasakyti apie dėstantįjį personalą. Šioje srityje būtina organizuoti daugiau personalo mokymų ir užsiėmimų, siekiant užtikrinti, kad dėstytojai deramai naudotų šias sistemas.

Programa yra reguliariai formaliai vertinama ir peržiūrima, o tai skatina nuolatinį studijų dalykų bei apskritai programos sandaros tobulinimą bei stiprinimą.

<...>

III. REKOMENDACIJOS

1. Ekspertų grupė rekomenduoja programos vykdytojams ir dėstytojams aiškiau apibrėžti skirtumus tarp dviejų su maistu susijusių magistro programų (MMSM (Maisto mokslo ir saugos magistrantūra) ir MPTM (Maisto produktų technologijos magistrantūra) tikslų, turinio, kompetencijų ir karjeros galimybių.
2. Grupė rekomenduoja sumažinti nustatytą studijų rezultatų skaičių ir šiuo atžvilgiu išryškinti skirtumus tarp įvairių programos elementų.
3. Grupė rekomenduoja rinkti ir atskirai apsvarstyti informaciją apie MMSM absolventų poreikį ir jų įsidarbinimo vietas, suteikiant informaciją, būtiną siekiant priimti tinkamesnius valdymo ir planavimo sprendimus.
4. Ekspertų grupė rekomenduoja praplėsti programos pagrindinę dalį, padarant su maisto kokybe ir saugumu susijusius studijų dalykus privalomais, tokiu būdu užtikrinant visų studentų deramą pasirengimą maisto mokslo ir saugumo srityse, kurių svarba ir vietiniame, ir tarptautiniame lygmenyje auga.
5. Ekspertų grupė rekomenduoja peržiūrėti/ pakoreguoti studijų pradžioje vykdomų mokslinių projektų pobūdį, turinį ir mokymosi mechanizmus, suteikiant studentams galimybę išsiugdyti atitinkamų maisto gamybos, saugumo ir kokybės grandinės verslo aspektų supratimą. Taip pat būtų pravartu aiškiau apibrėžti ir atskirti ankstyvųjų mokslinių projektų ir baigiamojo darbo tikslus bei temas.
6. Grupė rekomenduoja Katedrai apsvarstyti galimybę skirti daugiau laiko aptarimams grupėse ir komandiniam darbui.
7. Ekspertų grupė pataria kuo greičiau įsigyti papildomos įrangos ir susijusių išteklių, kurie būtini naujai į magistrantūros programą įtrauktų dalykų mokymui.

8. Grupė rekomenduoja Katedrai kuo greičiau atlikti planuotą šiai programai reikalingos mikrobiologijos laboratorijos atnaujinimą, plėtrą ir įsigyti susijusių molekulinės mikrobiologijos įrangą.
9. Katedra turėtų skatinti ir padėti dėstytojų komandai pasiekti geresnį dėstyto ir mokslinio tiriamojo darbo balansą.
10. Grupė rekomenduoja dėstytojų komandai peržiūrėti pagrindinių tekstų ir papildomos literatūros sąrašus, siekiant užtikrinti:
 - kad piko metu visi studentai turėtų galimybę naudotis nurodytais vadovėliais;
 - kad daugiau rekomenduojamų tekstų būtų anglų kalba ir kad jie būtų magistro studijų lygio.
11. Ekspertų grupė rekomenduoja apsvarstyti programos pavadinimo keitimą į „Maisto kokybė ir sauga“ arba „Maisto mokslas, kokybė ir sauga“.

<...>

Paslaugos teikėjas patvirtina, jog yra susipažinęs su Lietuvos Respublikos baudžiamojo kodekso 235 straipsnio, numatančio atsakomybę už melagingą ar žinomai neteisingai atliktą vertimą, reikalavimais.

Vertėjos rekvizitai (vardas, pavardė, parašas)