

# **Overview report of higher education study programmes in the field of Informatics in Lithuania**

*Roland Ibbett (editor), Andrew McGettrick, Peeter Normak, Jyrki Nummenmaa & Jukka Paakki*

**October 2014**

## ***Introduction***

This report summarises the findings of the Review Teams that evaluated the following seven groups of academic programmes during Academic Year 2013-14.

### Group I

1. Vilnius Gediminas Technical University (VGTU): Bachelor programme in Engineering Informatics
2. VGTU: Master programme in Engineering Informatics
3. VGTU: Bachelor programme in Information Technology Service Management
4. VGTU: Master programme in Business Information Systems

### Group II

1. Lithuanian University of Educational Sciences: Bachelor programme in Informatics Pedagogy
2. Mykolas Romeris University: Bachelor programme in Business Informatics
3. Vilnius University (VU): Bachelor programme in Information Technologies
4. VU Kaunas Faculty of Humanities: Bachelor programme in Business Informatics

### Group III

1. Vilnius Business College: Professional Bachelor programme in Computer Programming and Web-technologies
2. Vilnius Gediminas Technical University (VGTU): Bachelor programme in Multimedia Design
3. VGTU: Master programme in Information and Information Technologies Security

### Group IV

1. Šiauliai University (ŠU): Bachelor programme Informatics Engineering
2. ŠU: Master programme Informatics Engineering

3. Northern Lithuania College: Professional Bachelor programme in Administration of Computer Networks

4. Utena College: Professional Bachelor programme in Technologies of Information Systems

#### Group V

1. Klaipėda University: Bachelor programme in Informatics Engineering

2. Lithuania Business College: Professional Bachelor programme in Applied Informatics

3. University of Applied Social Sciences (UASS): Professional Bachelor programme in Applied Programming and Multimedia

4. UASS (Vilnius branch): Professional Bachelor programme in Applied Programming and Multimedia

#### Group VI

1. Kaunas University of Technology (KUT): Master programme in Information and Information Technology Security

2. KUT: Master programme in Information Systems Engineering

3. Vytautas Magnus University: Bachelor programme in Multimedia and Internet technologies

#### Group VII

1. Vilnius University (VU): Bachelor programme in Bioinformatics

2. VU: Master programme in Computer Modeling

3. VU: Bachelor programme in Informatics

4. VU: Master programme in Informatics

5. VU: Bachelor programme in Software Engineering

6. VU: Master programme in Software Engineering

Groups I, II and VII took place in Semester I, the others in Semester II. The Review Teams for Groups I and IV were led by Professor Andrew McGettrick, for Groups II and VI by Professor Roland Ibbett, for Group III by Professor Peeter Normak, for Group V by Professor Jyrki Nummenmaa and for Group VII by Professor Jukka Paakki. For each group, the relevant Team Leader co-ordinated the preparation a report based on the self-evaluation reports prepared by the institutions, wide-ranging

discussions held with staff, students, alumni and social partners from the institutions during the visits, and the views of the visiting Review Teams. Each report presents the findings of the Review Team under the headings suggested by the Lithuanian Centre for Quality Assessment in Higher Education.

The Review Teams suggested that of the 28 programmes evaluated, 11 should be accredited for six years and 14 for three years. The remainder were not considered appropriate for accreditation. The reports naturally focus on some of the areas where improvements could be made and make corresponding recommendations. Nevertheless there are also many positive points and instances of good professional practice.

### ***Group I & Group IV***

The four programmes in group I were all given positive evaluations with the Business Information Systems programme at Vilnius Gediminas University being recommended for accreditation for 6 years and the three others for 3 years. Only one programme in group IV was given a positive evaluation, with a recommendation of 3 years accreditation. Most of the problems in these groups seem to stem from a lack of appreciation of major international developments, problems with leadership that would drive forward innovation and new developments, and a lack of attention to the importance of diversity resulting in a tendency to be inward looking.

### ***Programme Aims and Learning Outcomes***

Generally these were reasonable, often being derived from national or European reports on skills. However, learning outcomes were often ill-formed (sometimes too ambitious and unrealistic) and failed to include attention to matters such as Bloom's taxonomy, or being measurable.

### ***Curriculum Design***

Generally there seems to be a lack of appreciation of international developments involving guidance on computing curricula. Major reports have been produced over a period of many years by the Association for Computing Machinery (ACM), the IEEE Computer Society and The Association for Information Systems (AIS). The production of these reports is ongoing and periods of public consultation are a major aspect of these to ensure that the work is valued by the community. But recognition of the existence of these has been sparse.

There are also related (but different) activities on benchmarking, accreditation, etc. Thus EQANIE, UK benchmarking, ABET standards, *etc.* and these have seemingly (on the basis of the SERs) received little attention here.

There are huge implications stemming from these observations. Curricula have become out-of-date, there has been little attention to major topics and little attention to matters such as pedagogy.

## ***Staff***

Staff resources are always a delicate matter. Generally there has been a lack of diversity in staff selection with many instances of staff coming from the same institution, gaining their PhDs from their own or a neighbouring institution, and so on. For visits abroad there has been a tendency to visit Latvia, Turkey, etc. There is much to be said for looking much further afield, to countries where modern developments are taking place: USA, Germany, France, UK, Canada, etc. This would provide a broader experience and a broader perspective. Attendance at major international conferences (ACM, IEEE Computer Society conferences, etc), looking for involvement in committees in these organisations, looking for liaisons with institutions in these countries, *etc* would all prove beneficial.

In the College sector there is a legal requirement that a certain proportion of the staff should have relevant practical experience (needed for the type of course typically offered in the College sector). Colleges often struggled with this requirement. But in addition there was little evidence of a recognition that these practical skills of staff had to be improved and kept up-to-date (and even replaced by other skills) with modern advances to ensure continued currency of these important skills.

The universities need to demonstrate their commitment to encourage excellence in teaching and learning by, for example, putting in place for staff prestigious awards for excellence in teaching. These should encourage innovative pedagogical developments that engage and motivate students and this includes the imaginative uses of (new) technology.

Academic standards could also be enhanced by ensuring that the research base meets the highest international standards. The Team believes that more staff should be exposed to and become engaged with these standards. One possible approach would be for the institution to develop agreements with highly prestigious institutions allowing promising colleagues to develop fruitful research links that produce real tangible achievements (*e.g.* International PhD agreements).

## ***Facilities and Learning Resources***

### ***Equipment***

Computer equipment tended to be fairly standard and usually sufficient. There was little evidence of really up-to-date equipment to support modern developments or modern approaches to teaching.

### ***Library Resources***

Libraries tended not to have a plentiful supply of modern texts; texts written in English tended to be more up-to-date than their Lithuanian counterparts and these were often in short supply.

Typically neither students nor staff had access to the best (as seen from an international perspective) digital library facilities. These could be seen as expensive but there are ways in which the costs can be reduced dramatically.

Remote access to facilities from outside the campus was uncommon.

### *Environment*

In many institutions it was disappointing to note the lack of educational material on display to create an environment in which students would be inspired, would find opportunity and generally would be even more highly motivated in their studies.

There was little mention of prizes and award for students, both internally to institutions or nationally, even internationally.

### ***Study Process and Student Assessment***

#### *Assessment*

Assessment is a problem. The assessment of learning outcomes is a matter that has not received serious or adequate attention. Certainly it is typically recognised that learning outcomes are addressed in particular modules. But that creates a considerable amount of data and typically the results will vary. A strategy is needed to come to a considered conclusion about a final judgement. This has not been apparent.

At VGTU the assessment systems are broken at all levels. Neither employers nor indeed the students themselves placed sufficient value or pride in their awards. There were signs that Microsoft or Cisco certification was really valued. After all, that provided an internationally recognised certificate that could be used for gaining employment either abroad or with international companies. So degrees were not valued to the same extent at all.

This needs to be addressed with some urgency so that education in higher education becomes uniformly respected and highly valued. Rigorous assessment regimes needed to be put in place at all levels. These must encourage students to achieve their full potential in all aspects of their work, reward excellence, and their implementation should include safeguards against misuse and not be overly bureaucratic.

One major question has been: who is responsible for academic standards? Is it the institution, the department or is it left to the individual lecturers to define standards? There has been little real evidence of quality control over assessment: moderation of exam papers, double marking, *etc.* But

the fundamental question is really: who has ownership of, and thus responsibility for, academic standards? If this is answered clearly, there are many consequences.

In the particular context of the final theses, there are major issues. It has been customary to have a social partner come and chair a small committee (that includes other social partners who outweigh the staff in terms of numbers) that gives final assessments of the theses. There is a lack of any evidence that the social partners were trained for this task. There is been a lack of evidence that their appointments were formally approved by the institution. The grades attributed to theses were generally out of line with other assessment, being inflated to a considerable extent.

### *Pedagogy*

The issue of how the curriculum is delivered is a vital matter that influences student motivation, student commitment and student retention. (Note that there are implications here for curriculum design). These are very important matters for all institutions and for students themselves. Related to this is the issue of prizes for excellent and innovative teaching. Nowadays there are regarded as important and are an important effort to increase the standing and the status of education in higher education.

### *Student representation*

A particular issue arose at VGTU where, on the course on *Information Technology Service Management*, the communication gulf between the staff and the students was a matter of concern to the Review Team and has to be addressed. The manner in which it is addressed is a matter for the Department but steps should be taken to ensure that there is easy and effective communication between staff and students, and that this is sustainable.

### ***Programme Management***

Institutional management seemed to be somewhat bureaucratic with changes taking considerable time. Smart, lean and agile management systems were not apparent and there was insufficient evidence of strong well-focussed imaginative leadership.

Departmental management has to take account of all aspects of quality; matters such as assessment, staff development, *etc.* have already been addressed. But generally management did not seem to recognise their responsibility to identify good young staff and then encourage and support their development towards international norms.

The selection of social partners tended to be based on the availability of opportunities for Practice and frequently these were supplied by graduates of the institution. However social partners tended to be one of the few sources of external advice about curricular matters; advice from alumni alone failed to

provide a sufficiently broad perspective. Questions could be asked in particular about the international perspective of the advice received from social partners, and their level of familiarity with the aims and objectives of programmes.

Generally input from social partners and others (*e.g.* alumni) tended to be informal and a result of discussion with staff members. There was little evidence of their views being carefully documented or agreed by all partners.

At VGTU the main internal quality system for providing feedback on courses in the University is broken. Students do not systematically provide feedback and are not motivated to do so. Staff expectations about the value of the system are low. In some cases informal mechanisms have been developed (and in some cases are effective in providing feedback to teachers) but these tend to bypass management and often create confusion.

The university should be encouraged to put in place a course feedback system that is non-threatening and effective, and is used systematically. It should provide rapid feedback to staff members. Its proper usage should be monitored.

The role of Head of Department is difficult. Yet during the review exercise in Informatics, the Review Team was told repeatedly by social partners that change is inevitable and will be ongoing. The position carries great responsibility and the incumbent needs to be able to bring about rapid and effective change. Part of that change should also involve addressing the recommendations of the Review Team. So the institution should give serious consideration to the role of Head of Department and the framework within which the Head has to operate to ensure there is an environment in which dynamic leaders can flourish and bring about effective ongoing change.

### ***Group II & Group VI***

The four programmes in Group II were all given positive evaluations with two being recommended for accreditation for 6 years and two for 3 years. The three programmes in Group VI were all given positive evaluations and were all recommended for accreditation for 6 years. The Review Teams were particularly impressed with the Bachelor programme in Information Technologies at Vilnius University, the Master programme in Information and Information Technology Security at Kaunas University of Technology (KUT) and the Bachelor programme in Multimedia and Internet technologies at Vytautas Magnus University.

### ***Programme aims and learning outcomes***

All the programmes in both these groups were rated at least good in terms of the programme aims and intended learning outcomes, in the sense that staff were clear about the kinds of graduates they wanted

to produce. However, in some cases this only became clear to the Review Teams following discussion with the staff, *i.e.* the aims could have been better presented in the documentation. This could also explain why many of the students on these programmes were thinking of different career paths from those for which the staff believed they were being prepared.

Particularly where a degree has been running for some time, writing the programme aims and learning outcomes can be seen simply as a necessary evil for the purposes of accreditation, rather than an opportunity for some serious discussion about the nature of the programme. Of course there need to be appropriate departmental management structures in place for this to happen. The mapping of individual course learning outcome to programme learning outcomes also requires careful thought and this is also an area where improvements could be made.

The Review Teams were also concerned that course descriptions were not always visible on departmental websites. Particularly where departments are keen to present an international image and to attract international students, course descriptions, staff lists, *etc.*, need to be clearly visible to the world in both Lithuanian and English. Departments were aware of this issue and did seem determined to make improvements.

### ***Curriculum design***

The Review Teams found considerable variation in the quality of the curricula, from satisfactory to very good. Where the Review Teams had concerns, the cause was generally a lack of awareness of, and an apparent complacency about, subject developments in the wider world, *i.e.* in the commercial world and the international academic world. Underlying this are the staffing issues discussed in the next section. The Review Teams made a number of recommendations about the curricula of all the programmes, though in the cases of the very good programmes these were intended as helpful suggestions, rather than criticisms.

### ***Staff***

All the programmes in these groups are appropriately staffed according to Lithuanian law in terms of qualifications and numbers but there is considerable variation in the quality of staff, as would be expected across a range of quite disparate institutions. Furthermore, in some cases, although there is a reasonable age profile, giving opportunities to bring in younger staff, many of the older staff come from non-computing backgrounds. This can have the effect of (a) skewing the curriculum to include more material than is necessary from their fields of expertise (b) placing undue teaching loads on younger staff who do have computing backgrounds. This is an issue that will diminish in significance with time but there are two other issues that arose both from the documentation and from discussions held during the visits that should be of national concern.



Firstly, a significant proportion of the staff are graduates of the institutions in which they are employed, a situation which operates against the spread of good practice and the challenging of entrenched ideas and attitudes, essential characteristics of a healthy university sector. The lack of staff mobility is particularly acute in informatics, a discipline in which graduates are in strong demand from commerce and industry, so it is actually quite difficult to attract students to postgraduate study and to fill academic posts at all. Graduates considering embarking on an academic career also tend to prefer to stay in a familiar environment rather than moving elsewhere.

Secondly, national legislation that insists that staff produce a given number of research publications each year is never going to guarantee that the research will be of high quality. Whilst there is obviously some very good research being undertaken in some departments, there is also evidence of publication for publication's sake, often as own institutional documents, and likewise at locally self-organised "international" conferences, rather than as papers at conferences outside Lithuania organised by recognised international bodies. Many staff would benefit from greater genuine interaction with staff in other countries, in relation to both research and teaching.

Despite these overall concerns, the Review Teams met a number of impressive, enthusiastic and dedicated staff who would be a credit to any major university.

### ***Facilities and learning resources***

The Review Teams found wide variations in the facilities and learning resources supporting the programmes in these groups, with two being rated satisfactory, three good and two very good. Where there were problems, many of them arose from the nature of the buildings in which the departments are housed. There are two main issues: (1) students increasingly bring their own laptop computers to their university and need spaces in which they can work, with seating, power outlets and network access; (2) employers (and international accreditation bodies) increasingly expect graduates to have group-work experience and this too requires the provision of appropriate spaces where a number of students can meet together and work as a group. In some cases there was a further area of concern: access for disabled students, a particular problem in older buildings. All the departments were well aware of these problems and were attempting to address them.

The computing facilities were generally very good, both in terms of quality and quantity, though in some laboratories there were numbers of older computers that ought to have been replaced and in some cases there appeared not to be sufficient support staff available to ensure smooth and secure running of both computers and internal networks. Good use is being made of on-line virtual learning environments, although, as everywhere, there is still some way to go to ensure appropriate and consistent use by all staff.

The Review Teams found quite a wide variation in the provision and use of library facilities, in terms of both physical books on shelves and on-line access to international repositories. In some cases students are active and enthusiastic in using both forms, in others there is a clear need to encourage students to engage with the world outside the confines of their home institution and to look beyond the course materials with which they are provided.

### ***Study process and student assessment***

The Review Teams were generally satisfied with the teaching and student assessment methods, and found examples of very good practice in some cases. A number of other issues did arise however, related to this area of evaluation.

Firstly, for three of the programmes in Group II, the Review Team was concerned about their future viability in the light of recent falls in student recruitment numbers. One definition of a good university is that it is one that attracts good students, so the perceived good universities in Lithuania have no problem in attracting students but some of the lesser institutions do. This problem is exacerbated by national legislation that insists that in order to be eligible for state support, students enrolling for an informatics degree programme must have a school level informatics qualification. It is being increasingly recognised internationally that in computing, school level qualifications are of little relevance to degree level study.

Secondly, there seems to be very little interest among students in taking advantage of the opportunities to study abroad for part of their degrees. This does not seem to be for lack of encouragement by their universities, though perhaps staff could do more, but the main argument put forward by students was that most of them have some form of employment from which it is difficult to take extended leave. This is unfortunate, since periods of study abroad are beneficial not just for the individual student but also for the sending and receiving departments.

Thirdly, there seemed to be a lack of awareness among many of the students about other activities going on around them, *e.g.* departmental research and relevant technical meetings in the local community. It is difficult to apportion blame between staff and students for this state of affairs and it may be in part due to cultural attitudes in Lithuania.

### ***Programme Management***

All the programmes in this group were managed within appropriate university frameworks of committees and with the involvement, informally at least, of all relevant groups of stakeholders (staff, students, alumni and social partners). In several cases, however, improvements could, and indeed should be made, by introducing more formal mechanisms. These would involve systematic meetings of staff with the various groups, of records being kept of their discussions and feedback being

provided subsequently of any actions taken in response to those discussions. Where the systems worked well, this was generally due to the enthusiasm and dedication of individual programme leaders, but such individuals do need to be supported by working institutional processes.

### ***Group III***

The three programmes in Group III were all given positive evaluations with one being recommended for accreditation for 6 years and two for 3 years. The Review Team was particularly impressed with the Master programme in Information and Information Technology Security at Vilnius Gediminas Technical University (VGTU).

### ***Programme Aims and learning outcomes***

The formulations of aims and learning outcomes seem to be inversely proportional to the actual level of programmes: a programme which satisfies just minimal quality criteria aims to prepare IT professionals who would be able to perform a wide variety of tasks, while an excellent programme is focused on relatively narrow but extremely important and perspective area. Consequently, the most ambitious programmes do not guarantee satisfactory achievements of all stated learning outcomes. It is noticeable HE institutions do not cooperate in agreeing on the foci of study programmes and division of work.

Concerning the private HE institution (Vilnius Business College), the IT programme is not closely related to the core competences of the institution; the college offers a traditional IT bachelor programme instead of more relevant Business Informatics, Information Technology Management, E-business/Electronic Business, Electronic Commerce etc.

### ***Curriculum design***

The general impression is that curricula are not so much driven by existing and prospective needs as by the existing academic staff, relying heavily on the preferences and competence of the teachers available. The consequence is that new and emerging areas are sometimes heavily underrepresented in the curricula (*e.g.* virtualisation, cloud computing and social computing in software engineering focussed programmes).

Special attention ought to be paid to the achievement of general competences. For example, no courses were offered in English. Inviting teachers from abroad in important subjects that are not covered by local teachers would have added value in several ways: modernizing the curricula, upgrading skills in English language, experiencing a different teaching/learning approach, offering opportunities for receiving students from foreign countries *etc.*

## ***Staff***

There seems to be a clear difference between private and public HE institutions: most of the academic staff in public institutions have full employment while academic staff in private institutions predominantly work on a part-time basis. This should be considered both as the major weakness of private HE institutions as well as an opportunity:

1. Part-time teachers spend only few hours teaching and tutoring/supervising students' individual studies.
2. Using non-permanent staff offers certain flexibility – institutions can invite teachers to deliver courses that are not within the competence of permanent staff.

The potential of researchers to teach and supervise students is almost unused. Researchers could contribute to widening the list of elective courses and supervising students in their own area of research, especially at masters level.

## ***Facilities and learning resources***

Access to scientific literature (paper-based and electronic) was absolutely insufficient. The fact that even VGTU does not have access to the ACM and the IEEE Computer Society Digital Libraries is simply not acceptable. Moreover, the libraries lack classical books on the topics taught at the university.

Another big issue concerns sufficiency of laboratories and their equipment with hardware and software. There seems to be no significant difference between the use of labs for practical teaching at bachelor level and master's level. However, bachelor level training should be more practical compared to the master level training; the majority of training at bachelor level should be conducted in labs, not in conventional lecture halls. Most of the labs the team visited satisfied just the minimum requirements.

## ***Study process and assessment***

There seem to be three, mutually interrelated, major problems: 1) insufficient supervision of students' individual work (homework), 2) a high dropout rate of students, 3) not enough group work.

The students spend on average about half of the time foreseen in the study programmes on individual work. This is a clear indicator of insufficient motivation and supervision of students, and leads in many cases to students dropping out. Most of the employers also mentioned lack of teamwork skills.

## ***Programme management***

Although all the institutions in this group had quality assurance systems, these seemed to be largely ineffective. At VGTU, for example, it is clear there are other factors that are much more influential than any formal QA systems. Two study programmes in the same faculty (Faculty of Fundamental Sciences) were of very different quality: one very good and another just satisfactory. According to this example, the presence of a competent, devoted and responsible programme manager is much more important than any institutional QA system!

### ***Group V***

The four programmes in group V were all given positive evaluations, with one being recommended for accreditation for 6 years and three for 3 years. The Review Team was impressed with research-driven education at Klaipeda University, and the teaching staff at Lithuania Business College. There was an interesting case where the University of Applied Social Sciences had “copy-pasted” a professional Bachelor programme from Klaipeda to Vilnius, and the conclusion from students' and social partners' statements revealed that the programme in Vilnius did not produce the same learning quality as the original programme in Klaipeda.

### ***Programme aims and learning objectives***

Generally, it appears that most programmes are successful in guaranteeing employment. As is typical in Lithuania everyone is employed before graduation. However, the skill and care taken to document the programme aims and learning objectives varies significantly; sometimes they are "to the point" but some can also be messy and confusing (much more than the actual education). In general, industry seems to be largely guiding the universities and not so much the other way round.

### ***Curriculum design***

Curricula were, generally speaking, found to be satisfactory. However, there is typically some legacy material that is perhaps kept in because there is a teacher to teach that topic or simply some work would have been needed to modernise the curriculum and this has not been done. Even though the social partners are consulted in most places, modern topics such as agile software development do not easily enter the curricula. This could be because of a problem with getting an existing teacher to renew the course or simply to find a qualified teacher for the topic.

### ***Staff***

There are quite large variations among the staff, in fact more than the marks show, since the variation partly takes place within the HEIs. At best, staff members are active in research and arrange interesting projects on timely topics for their students. At worst, staff publish in low-esteem publication fora to fulfil legal requirements and the courses lack developments with modern topics. In

colleges, in the best cases the teachers are competent, experienced and motivated; in the worst they are weak or do not really manage to guide the students to get the required practical skills.

### ***Facilities and learning resources***

Even though most are at least at a reasonable level, there is still variation in *e.g.* the hardware equipment, ranging from old to new. One place was lacking some important electronic materials, however mainly the electronic resources were quite satisfactory.

### ***Study process and student assessment***

Student assessment seems to be a problem everywhere. There are two main reasons for this. First of all, everyone gets employment, which naturally diminishes the importance of marks. Also, employment seems to start early on, so many important courses are still not studied at this stage, while at the same time the employers develop their own tests for selecting potential candidates. Of course, even then it would be possible to have a just and credible assessment system, but this seems to happen rarely. Otherwise, the study process was one of the strong parts of most programmes.

### ***Programme management***

Programme management does not seem to be the strongest part of Lithuanian computing education in universities and colleges. Many places do not implement anonymous feedback and may not even understand why such a system is needed. Social partners are always involved but their real impact is often questionable. As a strength, practically all programmes collect data from various stakeholders. However, the impact of this data seems to vary too much.

### ***Group VII***

The six programmes in group VII were all given positive evaluation, with four of them being recommended for accreditation for 6 years and two for 3 years. Based on the self-evaluation material and the site-visit, the Review Team found the Informatics-related study programmes at Vilnius University to be of good quality. The Team was particularly impressed with the Bachelor programme in Bioinformatics and the Master programme in Software Engineering.

### ***Programme aims and learning objectives***

Most study programmes are successful in guaranteeing employment. As is typical in Lithuania, almost all students in Informatics are employed in ICT tasks before graduation, which shows high labour market relevance of the education.

### ***Curriculum design***

The curricula of the study programmes are broad, containing enough major subjects, relevant minor subjects as well as enough general subjects. In principle, the curricula and the study plans also contain enough optional subjects, but in too many cases the optional courses are not (regularly) provided, for instance due to too few students enrolled. The curricula follow established international education standards in computer science, most notably the Computing and Computer Science Curricula Guidelines by ACM (Association for Computing Machinery) and the Guide to the Software Engineering Body of Knowledge (SWEBOK) by IEEE Computer Society.

A common problem in the curricula is the education in Mathematics which is in many cases too superficial for academic study programmes. In general, teaching and studying, especially in exercise sessions, should be more student-centred and interactive with the teacher in less central role.

### ***Staff***

The staff is competent in teaching but less qualified in research (in computer science): only a minority of them have research projects or publications in the actual scientific discipline. Also, the average age of the staff is relatively high and its turnover low. Therefore, a larger number of young and active researchers in computer science should be recruited to the study programmes.

### ***Facilities and learning resources***

The facilities (computers, networks, laboratories, libraries) are adequate and often quite modern. There is also enough up-to-date teaching material available to students, for instance via access to the ACM and IEEE digital libraries.

### ***Study process and student assessment***

Studies and social life of students are backed-up by various support processes. However, the students seem not to be aware of all the possibilities provided. The interest among students to Erasmus exchange is low, so they should be more encouraged and supported to take advantage of the numerous possibilities available. The drop-out rate of students is high, mostly due to having a (full-time) job already during the studies.

### ***Programme management***

All the programmes have a Study Programme Committee, including representatives of staff, students and social partners. The effectiveness of the Committees varies: while some Committees have a strong and continuous controlling role, some of them do not take full responsibility of the content and quality of the study programmes, leaving such issues instead too much to individual teachers. On the

other hand, the social partners in general seem to be satisfied with their possibilities to affect the programmes. The students do not seem to know if their feedback has any influence on the study programmes, so this should be corrected by publicly and regularly informing how the suggestions from the students (and social partners) have been processed and whether any changes have been made in the study programmes due to them.

### ***Some General Comments***

#### ***Quantity of study programmes***

It seems that there are currently too many study programmes in Lithuania in Informatics and related areas, with some of the programmes having too few students and too few applicants.

#### ***Quality Framework***

There would be merit in revising the quality framework with a view to drawing attention to matters addressed in this and related reports. Of course, the framework must serve all disciplines but hopefully such an exercise would prove valuable for the entire higher education community in Lithuania. At the same time some editing could be undertaken to remove ambiguity in the current framework. For example, in Curriculum Design: does ‘methods’ apply to teaching methods or methods employed within the discipline?

#### ***SER quality***

The Review Teams found considerable variability in the quality of the SERs. Advice similar to that given to students by a very distinguished physics professor in the UK, that in answering examination questions, “a mass of irrelevant verbiage is no substitute for facts”, would not go amiss. In submitting research papers for publication, authors are often given strict instructions about word and/or page counts, so academics ought to be familiar with this form of self-discipline. Several of the SERs were very repetitive and could have contained just as much useful information if they had been much shorter.

Related to this, many of the SERs contain judgemental statements such as “meets the requirements”, “are consistent”, “corresponds”, “fulfils”, *etc.*, instead of providing clear evidence to allow the Review Teams to decide to what extent the requirements are met, *etc.* In terms of legal requirements, for example, the HEIs should directly explain how they are fulfilled, instead of giving a set of possibly inconsistent documents and leaving the maths and the detective work to the Review Team, who certainly have better things to do.



It seems that the HEIs are not directly penalised for low quality of documentation. Therefore, they may be tempted to hide problems behind messy documents.

### ***Use of English***

The issue of the use of the English language is important. The Review Teams found considerable variability in the availability in English of the aims and objectives, *etc.*, of programmes on institutional webpages. The requirement to address this might be more explicit in the Guidelines.

### ***Definition of Informatics Engineering***

The Review Teams generally recognised that informatics engineering is indeed engineering. Paraphrasing from Wikipedia, it is about “the application of scientific, economic, social and practical knowledge in order to invent, design, build, maintain and improve structures, machines, devices, systems [...] and processes”. But it is a new form of engineering, and must be recognised as such. Its foundations lie in the disciplines of computer science, software engineering, computer engineering and mathematics (including statistics). It is about deploying computing in ways that are safe and secure. Nowadays computing devices need to be free from the terror of bad software and cyber threats; developers need to take account of the increasing concerns about usability, reliability and resilience, personal privacy and security.

### ***Women in Computing***

There are very few women on most of the programmes. This is an issue in most countries, not just Lithuania, but one that needs to be addressed.

### ***Conditional Accreditation***

Some other accrediting bodies, *e.g.* EQANIE and the British Computer Society, include “Conditional Accreditation” as one of the possible outcomes from an accreditation visit to an Institution. This situation arises where there are deficiencies in one or more of the programmes being considered that the visiting Panel believes could easily be rectified in time for the next programme start date. The relevant Accreditation Committee therefore offers Conditional Accreditation to the Institution and lists the conditions that the Institution must satisfy to gain full accreditation. The Institution is asked to respond, typically within three months or 90 days, with clear documentary evidence of the changes it is making in order to satisfy these conditions. The original visiting Panel members are then asked if they believe these changes will rectify the deficiencies. The Accreditation Committee then reconsiders its original verdict and can offer full accreditation in appropriate cases.

We believe it would be helpful for SKVC to consider introducing such a mechanism, particularly in relation to the three-year/six-year accreditation boundary.