



Tallinna Pedagoogikaülikool
Tallinn Pedagogical University

Faculty of Mathematics and Natural Sciences
Chair of Biology

**TALLINN PEDAGOGICAL UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF NATURAL SCIENCES
CHAIR OF BIOLOGY
CURRICULA:**

**Biology (Marine Biologist – Specialist
on Environmental Subject) BSc, code 6420240**

Biology (Ecology) MSc, code 7420201

Self-Evaluation Report

Tallinn 2004

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Introduction

The Process of Self-Evaluation

The present self-evaluation report focuses on the curricula of *Biology (Marine Biologist – Specialist on Environmental Subject) Bachelor's Degree* and *Biology Master's Degree* opened in the Department of Natural Sciences at the Faculty of Mathematics and Natural Sciences and of the Tallinn Pedagogical University (TPU). The curriculum was developed and opened before the curricula reform in TPU and run under 4+2+4 curricula system.

The self-evaluation report is the result of the teamwork and was written during the period of November 12, 2003 - April 08, 2004.

The assessment of the learning process and the curricula and writing the self-evaluation report was intensive work and valuable experience for the self-evaluation work group. The process of self-evaluation was led by the Head of the Chair of Biology but all the members of the commission were involved in compiling it.

Head of Commission:	Ass. Prof. Margus Harak	Head of Chair of Biology
Members:	Prof. Kalle Truus	Head of Chair of Chemistry
	Prof. Ülo Ugaste	Head of Chair of Applied Physics
	Ass. Prof. Tiina Elvisto	Chair of Biology
	Ass. Prof. Tõnis Põder	Head of Lectureship of Environmental Management
	Ass. Tõnu Ploompuu	Chair of Biology
	BSc student Triinu Tõrv	Biology (Marine Biologist – Specialist on Environmental Subject)

Communication between curricula designers (see Chapter 1.8.), self-evaluation work group (see Chapter 2.2.) and co-operation partners inside and outside the university increased substantially; acute contradictions, as well as positive trends appeared; new ideas and solutions emerged; a clear understanding was formed that weak and strong sides, problems and opportunities in a learning process and curriculum development are complex and interdependent; they need systematic solutions, team spirit and teamwork.

In the writing of the self-evaluation report and in discussions about it several people participated, such as students involved in both *Biology* curricula - *Biology (Marine Biologist – Specialist on Environmental Subject) Bachelor's Degree* and *Biology Master's Degree*, lecturers involved in the curricula, co-operation partners and colleagues outside the Faculty and University and the employers of Master students. We would like to thank them all for their understanding, objective feedback and evaluation, for readiness to listen, discuss and communicate. The self-evaluation report was read and proposals were made by Professor Henn Kukk, Faculty of Natural Sciences and Mathematics; Professor Romi Mankin, Department of Natural Sciences; Piret Lehist, Master student and also the translator of the self-evaluation

report, Department of Natural Sciences; Birgit Kuldvee, Department of Academic Affairs of TPU, Madis Lepik, Vice-Rector for Open University, Heli Mattisen, Vice-Rector for Academic Affairs and Larissa Jõgi, Department of Educational Sciences at the Faculty of Educational Sciences in elaborating the report. Also we would like to thank Anne Timm for her help with statistical data analysis and library databases Helle Kukk and Erika Jeret for translating the report into English.

In the compilation of the report the commission was guided by the following sources:

- Eesti Kõrghariduse kvaliteedikindlustus. H. Sillamaa. Eesti Vabariigi Kultuuri ja Haridus- ja Teadusministeerium. Kultuuri- ja Haridus- ja Teadusministeeriumi Teataja. *Internet:* www.ekak.archimedes.ee/bulla/bulla.shtml [22.01.2004] (Manual of Quality Assurance in Higher Education in Estonia. 1995.) and
- Kristoffersen, D.; Sursock, A.; Westerheijden, D. 2000. PHARE: Kõrghariduse kvaliteedikindlustus. Kvaliteedikindlustuse juhend: Metoodika ja praktika. Projekti raport november 1998. Toimetaja Varlamova, G.; eessõna autor Brennan, J Tõlge eesti keelde (tõlkija Reiska, J.). Eesti Kõrghariduse Akrediteerimiskeskus, Tallinn: Infotrükk. 88. (PHARE: Quality Assurance in Higher Education. Manual of Quality Assurance: Procedures and Practices. 1998.)

As the curricula under evaluation belong to the university educational process, brief overviews about the University, the Faculty of Natural Sciences and the Chair of Biology are presented.

The report has been discussed at the meeting of the Council of the Department of Natural Sciences on February 13, 2004; at the Faculty of Mathematics and Natural Sciences on March 5, 2004 and at the meeting of the academic commission of the board of the university on March 20, 2004. The self-evaluation report is a public document and is available at the homepage of the Chair of Biology (http://www.tpu.ee/~maku/biol_self_eval.pdf).

1. Brief Overview of Estonian Higher Education System and Tallinn Pedagogical University

1.1. A Brief Overview of Estonian Higher Level Education System

Estonian higher educational institutions are regulated by *the Law of Universities, the Law on Private Schools, the Law on the Organization of Research and Development, the Standard of Higher Education*.

The Estonian post-secondary system is undergoing radical changes, which among other factors takes into consideration the integration with the European Union. In accordance with the international education standards classification of UNESCO, education has the following levels: Pre-education, Basic education (the Primary level), Middle level of education (Secondary level) and Higher education (Higher level).

For each level there are standards, which are articulated in the state guidelines for educational programs. The curriculum guidelines determine the content of the compulsory programs, the time to be spent on teaching and description of the demanded knowledge and materials.

The Parliament of Estonia proclaims the principles of the educational system and general structure. The government is responsible for the state side of the programs and regulates the funding of Universities and other learning institutions. The Ministry of Education and Research is responsible for the curriculum and development of standards as well as implementation.

Institutions providing post-secondary education in Estonia are divided in two: the universities and institutions of applied higher education. The University is an educational, cultural and research institution where students can acquire an academic education. The purpose of the university is to advance knowledge through academic methods; create and develop on the basis of integrated learning and research opportunities to acquire an up-to-date post-secondary education which is up to standards; arrange for continuing education and provide society with needed knowledge and research services. Since 2002 academic higher education is provided at three levels: Bachelor's degree (a 3-year program); Master's degree (usually a 2-year program) and a Doctor's degree (usually a 4-year program).

The institutions of applied higher education are schools where students can obtain a higher education through studies toward diplomas. Their responsibilities are to provide an opportunity for post-secondary education, continuing education, and for conducting studies in applied research and development in their area (diplomas can usually be acquired in three years).

Noteworthy is the concept of state-commissioned education, which on one hand brings in financing from the public sector to post-secondary education and on the other hand allows direct education policy on a local and regional basis. Laws were passed, which gave the right to universities to charge fees for providing education, where either the student or some organisation pays for the student. The universities are using this to a large extent and this undoubtedly helps to increase educational funding.

As of January 1, 2003 there were 6 public universities in Estonia (Estonian Academy of Arts, Estonian Academy of Music, Estonian Agricultural University, Tallinn Pedagogical University, Tallinn Technical University, University of Tartu) and 10 private universities. In addition, there are 18 institutions of applied higher education.

1.2. A Brief Overview of Tallinn Pedagogical University (TPU)

The Tallinn Teachers' Seminary, the forerunner of Tallinn Pedagogical University, celebrated its inauguration on the 15th of September, 1919. With this date modern teacher training in Estonia started. Estonia's most widely known and prominent schoolmasters worked in this seminary. In 1928 the establishment changed its structure and was renamed as **Tallinn Pedagogium**. The courses lasted for two years and grammar school, technical college and art college graduates were admitted. The academic reorganization at the Pedagogium followed the university model, as a result of which, craft, singing and music courses became available, with domestic crafts, horticulture and primary teacher training courses following a year later.

However, in 1937, this system was declared inefficient and the Pedagogium reverted to being Tallinn Teachers' Seminary. In 1940 the seminary moved from Vene Street to Narva Road, into the newly finished premises of the State English College (the present main building of the TPU). Seven years later the establishment was reorganized as the Tallinn Teachers' Institute with a 6-year course. The first 4 years of the course had a general syllabus, years 5 and 6 focused on teacher training. Departments were opened specializing in the Estonian language and literature, the Russian language and literature, English, history, physics and mathematics, and natural history and geography. Music and singing, art and technical drawing and physical education were also offered. Graduates were qualified to teach classes 5 to 7 (ages 11 to 13).

In 1952 the **Tallinn Teachers' Institute** became an establishment of higher education with 4-year full-time and 5-year part-time courses. In the course of time the scope of the establishment broadened. In 1965 the department of cultural studies opened and the librarianship and bibliography course was transferred from University of Tartu; two years later the courses in pre-school education and psychology were opened. Besides teacher training, one of the main functions of the institute was the development of academic research and passing of knowledge to future generations.

In 1992 the establishment was renamed **Tallinn Pedagogical University** (Appendices 1 and 2). In April of that year the first honorary doctors were inaugurated. In 1995 TPU was granted one of six official state charters under Estonian law. In 1997 the Institutes of International and Social Studies and the Institute of Ecology joined TPU from the Academy of Sciences. In 1998 the TPU Haapsalu College was founded and in 1999 the TPU Rakvere College followed.

TPU has formal agreements of co-operation (including co-operation in research) with a number of universities in Finland (University of Helsinki, University of Jyväskylä, University of Tampere, University of Turku, University of Lapland), in Sweden (the Stockholm Educational Institute, University of Göteborg, University of Karlstad, the

Lund University), in Germany (the University of Kiel), in the Netherlands (the Delft University of Technology), in Belgium (the Gent University), in France (the University of Rouen), in the USA (the Armstrong Atlantic State University, the California State University) and others.

The last few years have been characterized by a wide reform of the learning program for which a modular curriculum has been instituted, new Masters' and doctorate courses have been opened. The TPU's importance in Estonian educational and scientific life has been growing with every year. TPU is the fastest developed Estonian public university over the past decade. At the present moment: 6,864 students study at our university and the number of alumni reaches around 16,000.

The mission of the University is to prepare intellectuals and via research and development activities to increase the intellectual capital of Estonian society.

The activities of the University support the formation of the human-centred and knowledge evaluating society in Estonia, where knowledge is held in high regard, where modernization and internationalisation are in keeping with the development of Estonian national culture, and where social security and economic advancement are equally valued. The primary task of the University is to generate a sufficient number of competent specialists for both the public and the third sector, especially in the sphere of education and culture. Promoting research activity enables the University to participate in the scientific discussion of Estonia and the world. The development activities are directed towards solving topical problems of society. The University sees its leading role in the development of teacher training in Estonia and thus recognizes its responsibility for granting the consistency of Estonian national culture.

In order to fulfill its mission the University cooperates with the general public, the City of Tallinn, media and politicians, but also with interest groups active in the sphere of education.

The University has got four distinct directions in its recent educational political resolutions:

- To increase the proportion of science and information technology;
- To increase the importance and capacity of the University (many institutes of the Academy of Sciences have joined, colleges in Haapsalu and Rakvere have been founded, new curricula are opened, the admission of students is growing, the amount of in-service training is on the increase, etc.);
- Cooperation with foreign universities and educational institutions, participation in international projects;
- Transition to the 3+2 curricula system according to the Bologna Declaration.

Academic Structure at TPU. There are six faculties at the university: Philology, Educational Sciences, Physical Education, Fine Arts, Mathematics and Natural Sciences, Social Sciences. The university has two colleges: Haapsalu and Rakvere. In addition, the Open University Continuing Education Centre and the Centre for Vocational Education belong to the university, as well as four research institutes: the Estonian Institute of Demography, the Institute of International and Social Research, the Institute of Ecology, and Institute for Educational Research.

Management Structure at TPU. TPU is administrated according to the traditions within the context of Estonian laws and charters of European universities. TPU has a

moderately centralised organisation with a three-level management structure (Appendix 3). The Rector of the University is the Head of the University Council, which membership includes vice-rectors, deans, appointed professors, elected representatives from faculties and from the student body. The Council forms commissions (development, research, education, economics, information, ethics and others) that prepare issues within their areas of competence for discussion in the Council and University Government. The University Government includes the members of the Rector's office, heads of administrative departments, deans of faculties and the heads of university institutions. The membership of the faculty councils includes a dean, vice-deans, heads of departments, professors and student representatives. The general departmental meeting includes all academic and administrative staff members of the department.

The development plans, policies and the organization of practical work in TPU are dealt with by: the Rector, Vice-Rectors, University Council and Government.

TPU Council:

- decides about the opening and closing of a speciality;
- approves of the general structure of curricula; Diploma, Bachelor's, Master's and Doctor's curricula and teaching regulations;
- establishes degree defence regulations and conditions, admission and graduation requirements;
- approves of the university budget and development plan.

When the Council ratifies a curriculum, it means that the curriculum is compatible with the Higher Education Standard and the general structure of the curricula at University. The Department of Natural Sciences is represented by 3 members in the Council of TPU: Prof. H. Kukk, Prof. R. Mankin, Prof. J.-M. Punning.

TPU Government:

- decides about all important educational political questions;
- works out the project of the university budget;
- prepares proposals about university admission and financing of student places.

The deans of all faculties belong to the University Government.

TPU Vice-Rector for Academic Affairs – his/her task is to manage the study activities in the university.

Academic commission of the board of TPU:

- deals with development plans of teaching, educational policies and principles of the compilation of curricula;
- implements the expert analysis of curricula, taking into consideration the mission and orientation of specialities;
- works out proposals about the rationalization of curricula and organization of studies;
- deals with principles of quality assurance.

In the academic commission of the board there are representatives from all faculties.

TPU Council's Research Commission together with the the academic commission of the board of the university provides the Council with proposals about study and research activities, degree studies and requirements for the academic staff.

TPU Council's Development Commission works out the development plan, the code of law and projects about the structural changes of the University.

Faculty Council:

- solves the problems connected with study and research activities inside the faculty;
- deals with educational political questions in its field;
- provides the Council with proposals for the ratification of the curricula and study programs of the faculty.

Dean is the head of a faculty, who is responsible for the development and condition of the faculty.

Academic department is the smallest administrative unit in TPU. A department is responsible for the design and realization of the curricula of its curated specialities, particularly major subjects. The head of a department is responsible for the development, condition and study activities of that department.

Chair or lectureship ensures the realization of studies and research work and their quality in its own field.

1.3. Study Process in Tallinn Pedagogical University (TPU)

The head of the academic department which conducts studies in a particular programme is responsible for fulfilment of the programme and quality assurance. The Faculty of Educational Sciences is responsible for the achievement of the aims in teacher training, coordinating its activities with the departments in charge of the programme and the respective subject methodologists. Chairs and lectureships conduct the study process and quality assurance within narrower fields and particular subjects.

Department of Academic Affairs

- Coordinates and organises the study process in the University, organises allocation of rooms and monitors their use. The department keeps the register of subjects and training programmes, improves and corrects the database. The department maintains the student database and prepares the required reports, issues documents confirming the studies and completion thereof and maintains the register of graduates of the University.

Dean's Office of the Faculty

- Documents students' academic progress, issues academic reports and nominates the grants, the grant committee also **includes a representative of the Student Board**.
- Prepares examination timetables by the beginning of the examination session and monitors completion of the curriculum.

Programme coordinator of the academic department

- Prepares timetables according to standard timetables.
- Organises registration of students in the studies and issues assessment sheets.

As of 2004 students use the electronic subject registration system. The system will soon be improved to allow students a rapid search for an overview of their academic progress.

The Board of the Department of Natural Sciences is responsible for the strategic organisation of studies (curricula, policies, etc.) and daily management of studies. The board also organises inspection and analysis of the practical organisation of studies. Achievement of subject-specific aims is the task of the head of the chair (lectureship) and members of the chair (lectureship).

The chair (lectureship) prepares a syllabus/subject programme for each particular subject which includes the content and volume of class and independent work, conditions of assessment, list of required reading, timetable of topics by lectures and/or seminars. The syllabi with conditions for taking examination/assessments are made available for the students at the beginning of the semester/first lecture.

The course system has been replaced by a system of subjects and the students have the right to select subjects according to self-designed study plans formulated on the basis of established requirements (prerequisite subjects, require number of credit points, etc.).

The academic counsellor helps students with the abovementioned activities; the dean's office exercises control.

The Department of Natural Sciences takes part in studies of other curricula, e.g. teaches chemistry and physics to students of vocational education, natural sciences (incl. biology) to students of educational sciences and didactics, physics to students of the Department of Mathematics, subjects in chemistry to students of craft and home economics, subjects of biology and geography to students of recreation, and services general and interdisciplinary electives e.g. *Developmental Studies*, *A Sustainable Baltic Region*, *Chemistry of Life*, *Introduction to Environmental Studies*, etc.

1.4. Curricula Development in Tallinn Pedagogical University (TPU)

Curricula development is tightly connected with developments in the Estonian education, including higher education, as well as in the European Union and the world.

The general structure of curricula is uniform and it has been worked out by the academic commission of the board of the university and approved by the University Council. The respective departments according to certain confirmed rules draw up the objectives of the curricula and education programs within them. After the discussion in the faculty council they are presented to the academic commission of the board of the university for amendments and additions. The final version of the curriculum is presented to the University Council for approval. The fact that curricula are published in the University Catalogue both on paper and in electronic version indicates that their objectives are made fully open to public.

Before June 1, 2002 the so-called **old 4+2 curricula**: Biology (Marine Biologist – Specialist on Environmental Subject) Bachelor's curriculum (6420240) and Biology

Master's curriculum (7420201) were registered by the Ministry of Education and Research, have been built up according to the scheme given in Figure 1.

Until the school-year 2002/03 the admission into Bachelor's level took place according to the following principles:

- The aim of Bachelor's studies is to deepen general education, to provide the students with sufficient theoretical knowledge and skills to start work in the chosen field of study or to continue their studies.
- The volume of Bachelor's programs is 160 to 200 (together with teacher training) credit points (4-5 years).
- Bachelor's studies end with the defence of a Bachelor's thesis and receiving of either the *baccalaureus artium* or *baccalaureus scientiarum* degree according to the curriculum.

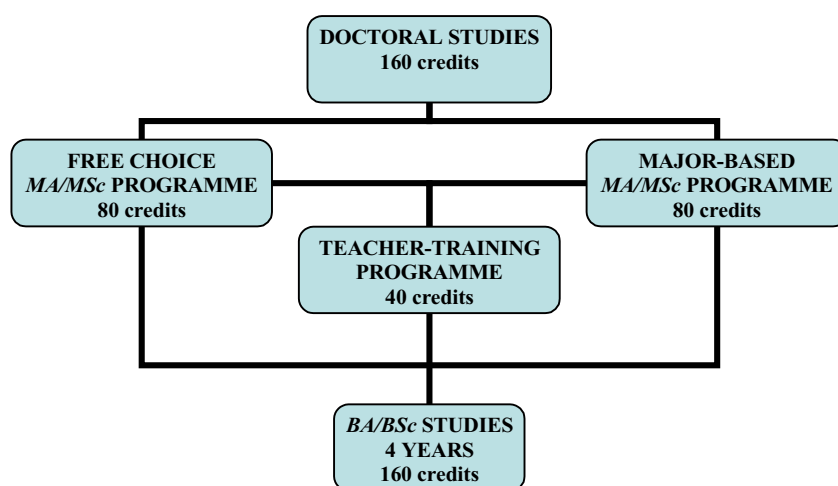


Figure 1. The system of studies in the Tallinn Pedagogical University (TPU) (before 2002)

- A person who has completed Bachelor's studies shall be awarded a diploma certifying the Bachelor's degree together with an academic report. The university shall also issue, free of charge, a diploma supplement in English if the person so requests.

The mentioned Bachelor's curricula have the following structure:

- **general subjects** (~20 CP)
(foreign language, informatics, social sciences);
- **major** at Bachelor's level (75 – 95 CP)
a block of subjects in the curriculum which determines the conferred degree;
- **minor** (additional curriculum) (30 - 40 CP)
a block of subjects that a student can choose in addition to his/her major and which is offered as a part of the major curriculum;
- **elective subjects** (5-10 CP)

subjects which are independently chosen by a student from the subjects taught at TPU or other universities in addition to major and minor courses to complete one's curriculum;

- **(teacher training 40 CP)**

In each complete Bachelor's program one can distinguish the following levels, and moreover, each level contains the ones preceding it:

- lower level (*approbatur*) 15 CP
- intermediate level (*cum laude approbatur*) 35-45 CP
- upper level (*laudatur*) 70-95 CP

At lower level the aim is to provide a systematic introduction to the curriculum, at intermediate level to give basic knowledge about the curriculum. The studies at upper level ensure advanced knowledge in the curriculum and at the same time prepare the student to continue his/her studies at Master's level.

The main emphasis lies on a major subject. If at intermediate or upper level a major branches off, the curriculum may arise from the chosen branch. In other cases, the items in the curriculum and major coincide. A major program ends with the compilation and defence of a Bachelor's thesis (10-15 CP). Thus, the volume of studies in a major is 85-110 CP.

In addition to the major program and general subjects a student has to study also one or more minor subjects, the volume of which depends on the curriculum (30 - 40 CP). Students choose minors according to their interests and also take into consideration the needs of their future employers. Minors are formed by the lower and intermediate levels of any major program. Students can take up a minor also in another university if that is accepted by the department. The curriculum might contain recommendations about the choice of minors. At Bachelor's level at least one minor (15 CP) should be available for students to choose freely. The combination of major and minor subjects also determines whether it is possible to continue one's studies at Master's level.

A student who wants to acquire the teacher's profession should take up a special teacher training program (40 CP), which involves educational subjects and didactics of the major together with a professional placement at school. It is possible to pass that program also after graduation – this means studying for one more year.

According to the **Master's curricula** registered among the curricula of the Ministry of Education and Research before June 1, 2002, the studies are based on the following principles:

- The Master's program involves studies at the second level of academic education with the objective of creating opportunities for Master students to acquire an education with a more focused professional specialization, to develop skills for planning, performing and applying the results of research, and to write and defend a Master's thesis.
- Master's degrees are divided into research and professional degrees. The Master's program in Biology gives a research degree- *magister scientiarum*.

Both curricula to be accredited contain the following material:

1. Study program (consists of subjects)
2. Course description

3. Syllabus (the calendar plan of the course which is given to students by the Chair)

Each study program consists of certain subjects. The outline of a subject is given by the course description together with a list of required and recommended reading. It also contains the code of the subject, title, volume, method of assessment, prerequisites, short description of the subject and name of the instructor. Learning methods include a lecture, seminar, practical class, report, work on literature and other types of auditory and independent work. The amount of independent work makes up about 50 % of the time spent on the subject.

The process of teaching the subject is reflected in the syllabus, which the students receive from their Chair. In addition to the information given in the course description, the syllabus also includes the description of independent work, methods of checking work during the semester, a list of study literature, topical plan of practical classes and seminars, requirements for exams and assessments. The syllabus is made available for students right at the beginning of a semester.

Since the academic year 2002/2003 curricula of the university have undergone fundamental changes. Transition to the 3+2 study system (3 years of Bachelor's studies + 2 years of Master's studies) brought along new curricula that do not merely offer the students knowledge in the area of specialisation, but also guarantee their sufficient social competence, develop readiness for lifelong learning and create the opportunity of transition between the curricula as well as universities. By now the transition process from the local credit point system to the European one (ECTS) has been initiated. One academic credit in Estonia is calculated as 40 hours of work. This may be awarded for the participation in lectures, independent work or any other combination of 40 hours of student work. One academic credit in Estonia equals approximately to 1.5 ECTS credits. ECTS credits express a relative measure of the student workload. In ECTS, 60 credits represent the workload for the full academic year of study. In order to obtain a Bachelor's degree at the TPU, the students are required to achieve minimum 120 credits (180 ECTS) over the three years of study and a Master's degree either in one year study – 40 credits (60 ECTS) or two-year study – 80 credits (120 ECTS).

General objectives of the curricula in the University are the following:

- To create conditions, at all levels of study at the university, for obtaining education based on the integration of educational, research and creative activities,
- To promote science in the University's fields of study,
- To enable opportunities for lifelong learning and offer necessary service for education, research and development.

The new 3+2 system gives the students a wider range of choice after completing the Bachelor's programmes. For instance, the graduates of *Biology (With Second Subject)* Bachelor's programme can choose between several programs at Master's level: *Biology, Geo-Ecology, Teacher of Biology, Teacher of Natural Sciences, Environmental Management, etc.* The most successful graduates of the Master's program can apply for the doctoral studies.

The system 3+2 can be illustrated as follows (*Regulations for the Organization of Studies* <http://www.tpu.ee/editmode/english/studies/regStudies.pdf>):

General subjects	15-20 credit points
Focus subjects	15-20 credit points
Core subject	45-60 credit points
Bachelor's thesis or exam	4 credit points
Minor subject I	15 credit points and/or
Minor subject II	15-30 credit points
Electives	6-9 credit points

Updated versions of the Regulations for the Organization of Studies are published in the Subject Catalogue of TPU and are also displayed at the website of the University (www.tpu.ee). Changes in the organization of studies are made with the resolutions of TPU Council or the Vice-Rector for Academic Affairs.

The students are admitted to the *BSc* studies; however, the graduates of a *BSc* program can continue their studies in an *MSc* program corresponding to their specialisation. The public educational demand compiled by the state determines the number of Master's degree specialists required. At the same time, the state obligates the University to create 1.5 times more *BA/BSc* student vacancies than *MA/MSc* vacancies. For example, if the state demand for Biology (With Second Subject) *MSc* students is 20, based on this, the University has to create 30 student vacancies at *BSc* level. The *BA/BSc* curricula of Tallinn Pedagogical University have been compiled according to the fields of study.

According to the new curricula proceeding from the Bologna Declaration the system of studies at the university can be characterised as follows:

The study load is calculated in credits (CR). One credit corresponds to 40 hours of studies, from which at least 50 per cent is individual work.

The *MA/MSc* curricula are specialisation-based and illustrated in Figure 2:

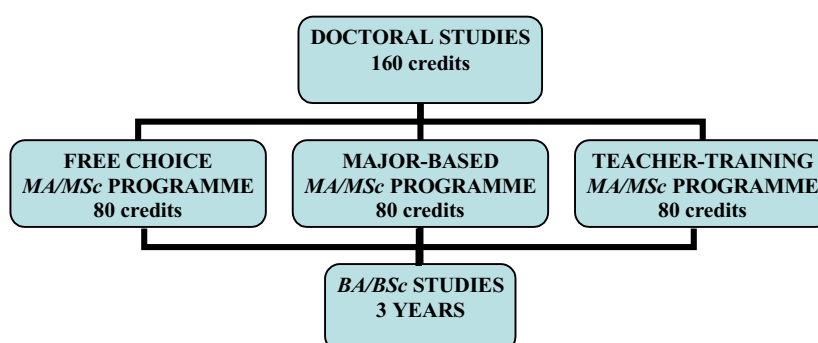


Figure 2. The system of studies in the Tallinn Pedagogical University (TPU) (since 2002)

At the end of a *BA/BSc* program, the thesis is defended. All graduates are free to apply for the *MA/MSc* studies, but they can also enter the labour market and receive in-service training already at work.

The fields of study in the TPU are:

- Humanitarian sciences
- Fine arts
- Physical education
- Social sciences
- Natural sciences
- Exact sciences
- Education sciences and teacher training.

In numbers the Tallinn Pedagogical University can be characterised as follows (according to the data from January 1, 2004):

The total number of students: 6,864 (including 970 students of the diploma studies, 4,551 students of the Bachelor's level, 1,217 students of the Master's level, 126 students of the doctoral studies).

The number of graduates in 2003: 435 graduates of the diploma studies, 539 - of Bachelor's studies, 217 – of Master's studies, 12 – of doctoral studies

The number of lecturers: 211 full-time lecturers, 117 part-time lecturers

There are 6 faculties, 5 institutes, 2 colleges and 76 chairs.

The number of curricula: 44 for the Bachelor's level, 70 for the Master's level, 17 for the doctoral studies.

The space area in total 44,760 square metres.

1.5. Conditions for the Completion of Studies

The completion of the curriculum is possible when the student has completed his/her studies according to the requirements of the curriculum and the mean grade of assessment is a minimum of “satisfactory” (≥D) and has written a Bachelor's or Master's thesis and defended it for a minimum of “satisfactory” (≥D) grade.

Assessment shall be carried out via tests, seminars and practical classes; grades are awarded at examinations, graded assessments and at the defence of seminar and final papers. The forms of assessment are set out in the curricula and syllabi; they serve the aim of recording the level of students' knowledge and skills.

Transfer of students to the next academic year is performed on the basis of the sum of credit points collected during studies. The student is considered:

- a first year student from matriculation until he/she has collected 34.5 CP;
- a second year student if he/she has 35 CP;
- a third year student if he/she has 75 CP;
- a fourth year student if he/she has 115 CP.

The system of assessment is described in detail in Chapter 3.2. *Assessment and Analysis of Study Results*.

A prerequisite for the defence of a Bachelor's or Master's thesis is the completion of all elements of the curriculum. The defence of final papers or the taking of final

examinations takes place at the end of the autumn or spring semester at a time established in the academic calendar. The students are permitted to defend their theses by order of the dean, prepared a minimum of two weeks before the date of the defence and submitted to the Department of Academic Affairs. The commission has at least three members, including the chairperson who, as a rule, has a doctoral degree or corresponding qualification. Membership of defence commissions for theses in the Bachelor's study are approved by the dean of the faculty, and in the Master's study by the Vice-Rector for Academic Affairs on the basis of the dean's proposal. In order to ensure the required quality of Bachelor's, Master's and doctoral theses, the defence commission of the department traditionally includes recognised specialists outside the Tallinn Pedagogical University (TPU).

Requirements for term papers, Bachelor's and Master's theses are set by the Department of Natural Sciences (www.tpu.ee/editmode/akastruktuur/matemaatika/loodusteadused/juhend.doc). As a rule, the volume of final papers in the case of a 15 credit-point research paper is, 30-50 of printed text (1 page = 2,250 characters). Uniform requirements for final papers (including the referencing system), that conform to international standards, are used in the faculty.

Bachelor's and Master's theses are submitted to the defence by dean's order along with the opinion of the supervisor and a written review. The head of academic sub unit nominates a reviewer for the final paper. The reviewer must be a renowned specialist of the curriculum and have a degree a minimum of one level higher than the paper defended (the reviewer of the Bachelor's paper must have a Master's degree or equivalent qualifications). A written review (minimum one page) must be submitted to the department/chair a minimum of three days before the defence. The student has the right to examine the review of his/her final paper.

The department/chair shall announce to the students and the dean's office the dates for the submission and defence of final papers two months before the date of the defence at the latest. Students must submit their final paper to the department/chair a minimum of two weeks before the defence with the supervisor's signature on the title page proving that the final paper has been authorised for defence. The department/chair must then present the names of the students who have submitted final papers, along with the names of their supervisors and the titles of their final papers in Estonian and English to the dean's office of the faculty two weeks before the defence.

The defence of Bachelor's and Master's theses is public and is performed before a defence commission in the room and in the order made public by the department. As a rule, the student's supervisor(s) and the reviewer attend the defence procedure. The defence primarily concentrates on the analysis of the paper but may also involve more extensive assessment of knowledge. The results of the defence of final papers are made public to the students on the day of the defence according to the assessment scale of TPU (Chapter 3.2). The grade "sufficient" is not a positive result in the case of Bachelor's theses.

Grades are entered in an established protocol form. The signed protocol shall be submitted to the dean's office of the faculty at the latest on the day after the grades have been made public. The results of the defence of final papers are made public to the students on the day of the defence immediately after protocols have been completed. Waiving the defence of the final paper/taking the final examination where

no valid reason is given will be equal to a “fail” (F). The note “withdrawn” is entered in the protocol about any student who fails to appear without a valid reason. Illness, proven by a medical certificate and submitted to the chairperson of the commission, will be accepted as a valid reason. If the student fails to submit a medical certificate within three working days, the note “withdrawn” will be repealed and a negative result entered in the protocol. Any student who failed to appear for a valid reason has the right to defend their final paper on a day determined by the chairperson of the commission within the examination session. In the case of a negative result a repeated defence of the final paper is possible in the following semester at a time established in the academic calendar. The final paper may be defended one more time. For the next defence the commission requires improvement of the present paper or the choice of a new topic.

The defence commission may change its decision within three working days of the day of defence of the final paper if proven discrediting information becomes evident (plagiarism, presenting falsified information, *etc.*). Evidence that formed the basis of the changed decision is appended to the changed decision. In the case of proven plagiarism, the student shall lose the right to attempt a subsequent defence of the present final paper. The student must choose a new topic to complete the studies. If the student does not accept the grade received at the defence or the defence procedure, he or she has the right to submit an appeal in writing to the dean within three working days after the results have been made public. The dean shall establish a three-member commission, which will hear the appeal and notify the dean of its decision within ten working days from the student submitting the appeal. The dean shall make the decision public in writing to all parties concerned including the defence commission.

Repeated defence of term, Bachelor’s and Master’s papers which were given the grades “sufficient” or “fail” is possible one more time after one year and also in the same year according to the procedures established by the department. The student has the right to dispute the issues related to the defence procedure within three working days and submit an appeal in writing to the dean.

After the completion of the curriculum and defence of the final paper or gaining a pass in the final examination, the graduate of the university shall be issued a diploma and academic report documenting the issuance of the degree and/or the completion of the curriculum. The statute and procedure for the issuing of diplomas and academic reports is enacted by the regulation of the Government of the Republic, “Statute and Forms for Diplomas and Academic Reports” (RTI, 19.03.2003, 29, 175).

1.6. Faculty of Mathematics and Natural Sciences

The Faculty of Mathematics and Natural Sciences (see Figure 3 and Appendix 4) prepares teachers and specialists in mathematics, computer science, physics, biology, environmental sciences, natural sciences, craft and home economics, vocational pedagogics, craft and technology education. The main areas of research of the Department of Mathematics are: algebraic structures; geometry of figures; summation theory of lines; harmonic analysis and approximation theory; problems of the curricula and textbooks of school mathematics; methods of educational

research. The main areas of research of the Department of Computer Science are: information technology and its methods of teaching. Researchers of the TPU work in close co-operation with the Estonian Academy of Sciences. TPU has been very successful in training teachers in mathematics and natural sciences. A major amount of school text- and work-books in Estonia after the Second World War have been written by the university teachers of the Faculty of Mathematics and Natural Sciences (e. g. A. Telgmaa, O. Nilson, E. Prikk, K. Kärk, R. Kolde, T. Tõnso, H. Karik, V. Ratassepp, Ü. Ugaste, T. Elvisto, E. Lind, K. Pappel, etc.).

Proceeding from the missions of Tallinn Pedagogical University as a whole, the objectives, tasks and the responsibility of the Faculty of Mathematics and Natural Sciences are fixed in the resolutions of the TPU.

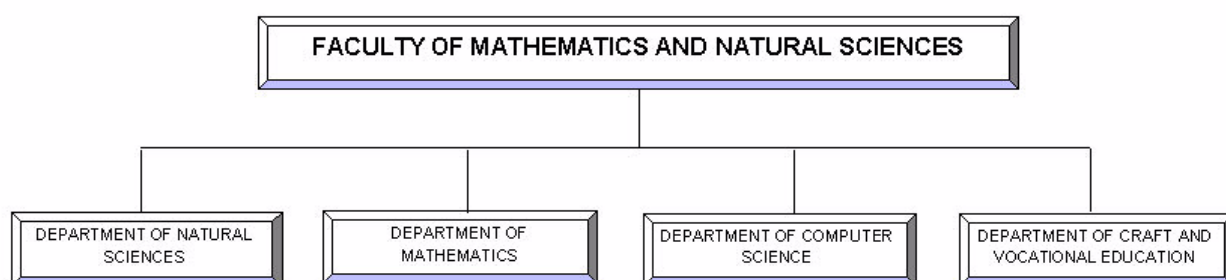


Figure 3. Structure of the Faculty of Mathematics and Natural Sciences.

1.7. Department of Natural Sciences

The Department of Natural Sciences in the frame of the Faculty of Mathematics and Natural Sciences of the Tallinn Pedagogical University (TPU) was founded in 1993. Teaching natural sciences in connection with teacher training has been carried out under different structural units during the whole existence of TPU. The Department of Natural Sciences prepares teachers of natural sciences and specialists on environment. It consists of the Chair of Biology, the Chair of Geo Ecology, the Chair of Chemistry, the Chair of Applied Physics, Chair of GeoPhysics, the Chair of Theoretical Physics, and the Lectureship of Environmental Management (see Figure 4). The research of the department focuses on the following themes: dynamics of associations in technogenetic ecological systems; describing and modelling the processes of substance circulation in coastal sea and different lake types of Estonia; stochastic processes and their interdisciplinary applications; interdiffusion in metal systems; structural research and biotechnology of algal polysaccharides.

The first specialists in the field of biology-chemistry (a joint speciality) got their schooling in Tallinn Pedagogical Institute right after the Faculty of Mathematics and Natural Sciences had been founded in 1952. The 1960ies and 70ies in Estonia were characterized by several educational reforms, which were carried out by the spirit of socialist centralization. On request of the Communist Party of the Estonian Soviet Socialist Republic, the teaching of natural sciences, biology included, continued only in University of Tartu. It finally became possible to teach biology again in TPU in the year 2000. On Nov 24, 1997 M. Klaassen (the former Minister of Education of

Estonia) and M. Arvisto (the former rector of TPU) signed an agreement according to which the Institute of Ecology became an autonomous research institution of TPU. On May 9, 1997 TPU signed a cooperation agreement with the Estonian Marine Institute (University of Tartu). These two documents laid the modern foundation for the study and research work in the Chairs of Biology and Ecology.

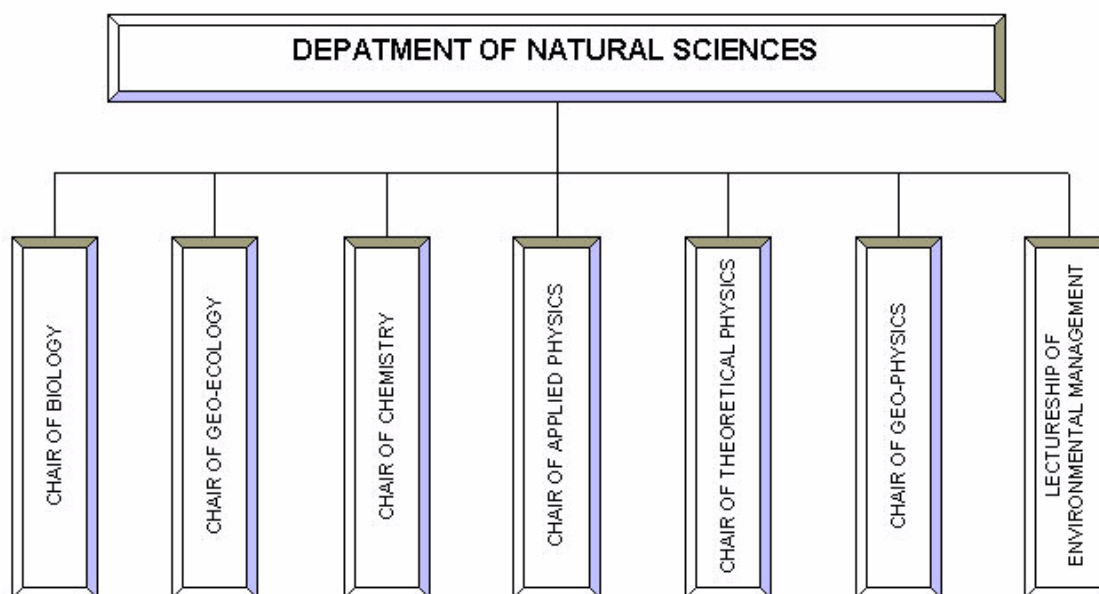


Figure 4. Structure of the Department of Natural Sciences.

The mission of the Department of Natural Sciences of TPU is to support the sustainable development of the Estonian society and state through preparing intellectuals in the field of natural sciences, their research work and application of results, and academic partnership.

Scientific activities of the Department covers research in biology, geoecology, environment management and environmental situation assessment, chemistry, physics and pedagogics. The main fields are: natural and man-generated factors of the development of landscapes and ecosystems, transportation of substance and energy and its regulation in coastal sea at various production levels, preparation and application of didactic aids for teaching natural sciences (incl. biology) in comprehensive school, and application of stochastic processes in research of open systems (Appendix 5). The number of topics and sub-topics being worked on in the department was 19 in 2002. The department's teaching staff participated in the completion of two international research projects, six grants of the Estonian Science Foundation, three topics with targeted financing and three topics on a contractual basis.

The teaching staff worked in the following international research projects in 2001-2003: Prof. Ü. Ugaste – INCO-Copernicus, contract No ER BIC 15cT980811; Ass. Prof. T. Elvisto, Prof. H. Kukk – A Sustainable Baltic Region, The Baltic University Programme – A Regional University Network and Environmental Science for the Baltic Sea Basin, The Baltic University Programme – A Regional University Network; Ass. Prof. M. Harak – an international project Sustainable Water Management, The

Baltic University Programme, A Regional University Network; Ass. Prof. E. Karofeld – European Commission 5th Framework Project ACCROTELM Abrupt Climate Changes, Recorded Over the European Land Mass: Multi Proxy Records of Late Holocene Climate Variability in Europe. European Commission Contract No EVK2 2002-00166; Ass. Prof. A. Lõoke – project Lipoprotein Lipase Binding to Vascular Endothelium; assistant lecturer T. Ploompuu – international project Quantification of Alkaline and Acidifying Deposition Loads from Estonian Industry; senior research fellow P. Reiska – research project Physiklernen und Handeln of Kiel University; Prof. Ü. Ugaste – International Atomic Energy Agency project EST-12062.

Beside the above-mentioned projects research of teachers and students is financed from various research and study foundations of the university (TPU Science Foundation, TPU Study Foundation, etc.) and academic departments.

All the chairs cooperate with Estonian or foreign universities. The most successful in terms of contracts is the Chair of Geo-Ecology which has bilateral contracts with London University, Ioannina University, Umea University and Uppsala University within the Erasmus Programme. The department has research and study contacts with Helsinki University, Turku University, Kiel University, Institute of Biophysics of the Free University of Berlin, Armstrong Atlantic University (USA), Eindhoven Technical University, Savannah University, Krakow University of Mining and Metallurgy, Gdansk Technical University, Moscow Institute of Material Sciences, Institute of Organic Chemistry of Russian Academy of Sciences, Warsaw Institute of Plasma Physics, and many others. There are plans to strengthen these relations in the near future, especially by our own stronger contribution to make the relationships more efficient.

The following staff have worked and delivered lectures abroad: Prof. J.-M. Punning (Ioannina University, Greece), Prof. Ü. Ugaste (Warsaw Institute of Plasma Physics and Laser Microfusion, Poland), Ass. Prof. A. Lõoke (Umea University, Sweden), Ass. Prof. T. Elvisto (Turku Polytechnic, Finland), P. Reiska (Kiel University, Germany), A. Metsis (Laboratory of Parasitology, Statens Seruminstitut, Copenhagen, Denmark and Karolinska Institut, Sweden), and Ass. Prof. M. Harak (Free University of Berlin, Germany).

Prof. J.-M. Punning is a member of the General Assembly of the International Geography Union; Prof. H. Kukk is a member of the Committee of the Baltic Marine Biologists; Prof. Ü. Ugaste is a member of the Pre-University Section of European Physical Society Education Division; Ass. Prof. T. Elvisto is a member of the EURO BIO Council; Ass. Prof. M. Harak is a member of the International Society for Biological Calorimetry. Five teachers of the curriculum of natural sciences are members of subject committees of the Ministry of Education and Research, of them M. Harak is the Chair of the Biology Subject Committee. Prof. K. Truus, Ass. Prof. M. Harak, Ass. Prof. T. Laas and Ass. Prof. E. Karofeldt are advisers in the expert committee of acquisitions of the TPU Academic Library, the TPU Library (a study library) and the National Library of Estonia.

In 2001-2003 the teaching staff published 95 papers, 54 of them in international publications; 50 conference abstracts, including 42 international ones as well as two collections and numerous other publications. The number of publications has increased from year to year.

The staff have participated in writing 13 textbooks for comprehensive school and six for higher education, and numerous other study materials including those published on the Internet and university intranet. The number of materials written and published per teacher is 0.8. The list of publications in the last three years is in Appendix 6.

Several research topics in the Department of Natural Sciences have been internationally evaluated. In 2000 those of the curriculum of ecology were evaluated. The research group of paleo-ecology led by Prof. J-M. Punning was graded as "excellent" and the research group of wetlands led by Ass. Prof. E. Karofeld as "good".

Two research topics in the curriculum of physics were evaluated in the spring of 2001: "Stochastic Processes in Open Systems" (project manager R. Mankin) was graded as "good"; "Didactical Issues of Teaching Physics in the Conditions of Estonian Educational Reform" (project manager Ü. Ugaste) was also graded "good".

Evaluation of educational sciences at TPU incl. didactics of natural sciences was carried out in the autumn of 2001 and was assessed as "good".

Bachelor and Master Students are largely involved in the research carried out in the Department incl. the Chair of Biology, the structural unit which directly coordinates the curricula of Biology.

High standards of the staff are characterised by the results of student papers they supervise at the TPU competition of research papers. In 2002 ten students of the Department received awards in this competition, 11 in 2003. The student Liisa Puusepp won the first prize at the competition in 2002. Students who are supervised by the staff of the Department have successfully participated in national competitions. For instance, in 2003 these students were awarded prizes: Alar Mägi's research article (with co-authors) – the winner of the Swiss Baltic Net Graduate Awards; Hele Kiimann – 2nd prize in the competition of student papers of the Estonian Academy of Sciences; Tiit Vaasma – a diploma in the student research competition of the Estonian Ministry of Education and Research in the field of biology and geology; Tambet Lember – 2nd prize in technical sciences and Astrid Haljas – 1st prize in exact sciences.

The staff of the Department have been active in education policymaking. Five of them are long-term members of subject committees of the Ministry of Education and Research. M. Harak is the Chair of the Biology Subject Committee. The teaching staff are involved in working out and development of the new national curriculum of basic and upper secondary schools, and of vocational schools, and in reviewing and approval of textbooks for primary, basic, upper secondary and vocational schools, *etc.*

Several teachers (Ass. Prof. M. Harak, Ass. Prof. T. Elvisto, lecturer S. Siska, *etc.*) have been actively participating in the committees of the State Examination and Qualification Centre of the Ministry of Education and Research, which organise and conduct state examinations in biology and geography.

The department secures teaching of natural sciences in the curricula of class teacher and recreation management.

Financing. The Department of Natural Sciences has two independent budgets: A budget, which is state financed and is based on the number of syllabus credits earned by students in the previous academic year and the number of defended degrees. B-budget comprises self-earned resources, including the students' fees (the fee is determined by faculties and approved by the University Government), incomes from projects or advanced courses. The budget is approved of at the department meeting and at the Faculty Council. The Head of the Department is responsible for the implementation of the budget.

A provisional budget for the year 2004 is still in development (Appendix 7). As the number of state-financed study places will be presented only in May, it is not easy to draw up the budget.

1.8. Chair of Biology

The structural unit in Tallinn Pedagogical University (TPU) supervising the curricula *Biology (Marine Biologist – Specialist on Environmental Subject) Bachelor's Degree* and *Biology Master's Degree* is the Chair of Biology.

The staff of the Chair of Biology:

Margus Harak, PhD in Entomology, Head of the Chair, Ass. Prof.

Anne Timm, senior lab assistant-office manager

Arno Põllumäe, MSc in Biology, lecturer

Ats Metsis, PhD in Molecular Biology, Ass. Prof.

Henn Kukk, Cand. Sci. in Biology, Prof.

Tiina Elvisto, Cand. Sci. in Biology, Ass. Prof.

Toomas Pöld, Doctor of Medicine, lecturer

Toomas Veidebaum, Cand. Sci. in Biology, Ass. Prof.

Tõnu Ploompuu, MSc in Biology, Assistant

Some of the academic staff involved in the study work have got temporary contracts: Ac U. Margna; T. Raid, PhD; T. Paalmäe, MSc *etc.*

The topics of scientific research in the Chair of Biology in Tallinn Pedagogical University are: Importance of freefloating macroalgal mats in the processes of accumulation and transport processes of energy and matter in the Estonian coastal waters; Thermodynamical regulation and other physiological processes during the normal and defective metamorphosis of Arthropoda (in cooperation with the Institute of Plant Protection of Estonian Agricultural University); Seasonal Dynamics of Mesozooplankton and Eutrophication of Coastal Sea Role of functional diversity in the stability of coastal ecosystem in the northern Baltic Sea (in cooperation with the Estonian Marine Institute of University of Tartu); Dynamics of coastal meadows, reedy marshes and flood plains (in cooperation with DANCEE and Matsalu Nature Reserve); Integrative functions and psycho-physiological principles of Human Brain. (supervised by University of Tartu); Formation of cultural Flora and antropogenic plantal communities; Systematics of Apomictic Species (in cooperation with Tallinn Botanic Garden), Methodology and Didactics of Nature Study and School Biology (in cooperation with other faculties and chairs of TPU (see the previous chapter and Appendices 6, 8).

In all the academic units of Tallinn Pedagogical University, including the Chair of Biology, there take place regular scientific seminars (open too all the members of the staff, students and other interested people).

The Chair also provides courses in Biology and Environmental Sciences for the students of the teacher training program in TPU and in the framework of the curricula of Classteachers and Recreation Management.

2. The Curricula *Biology (Marine Biologist – Specialist on Environmental Subject) (6420240) Bachelor's Degree and Biology (7420201) Master's Degree*

2.1. Goals and Basic Principles of the Curricula

The goals of the curricula to be accredited conform to the general guidelines of the EU Bologna and Lisbon agreements and the **Single Programming Document** adopted by the Estonian Government on 15.05.2003, decree No 300-k (RTII, 28.05.2003, 13, 58) <http://www.fin.ee/doc.php?6129&PHPSESSID=fbe5ac36d8a7daf9dd2cc83b19ca4b0a>).

According to the Lisbon Strategy, the prioritised fields of research are the curricula of mathematics and natural sciences and the number of graduates should increase by 15% by the year 2010.

The Single Programming Document provides for an educational system which is accessible to everybody and which secures flexible labour, coping and lifelong learning. The goals of development of the infrastructure are among others, maintenance of biological and landscape diversity and support to efficient nature conservation in order to meet the requirements of the EEC directive on natural habitats (Council Directive 92/43/EEC) and the directive on wild birds (Council Directive 79/409/EEC).

The **Bachelor studies** curriculum of *Biology (Marine Biologist – Specialist on Environmental Subject) (6420240) Bachelor's Degree* was opened at Tallinn Pedagogical University (TPU) in 2000. The objectives of the curriculum are training biologists with a high level of environmental awareness with an integrative approach to natural sciences, able to work in the field of research of (marine) biology and environmental studies. The main objective is to provide an extensive foundation education in biology which would enable graduates to work as junior researchers in research institutions and secondary schools. Graduates are prepared for independent research or entering a Master's programme. The teacher training programme provides the qualification of teacher of biology and environmental studies in upper secondary schools.

Master studies (*Biology, 7420201*) in biology were commenced in 1997 primarily to allow students of the then joint curriculum of natural sciences continue their studies. The objectives of the curriculum are to train qualified biologist-ecologists who would be able to work as researchers or university teachers, experts on environmental issues, specialists of environment protection or protected areas, or teachers in upper secondary schools after a teacher training programme.

Doctoral studies in biology are conducted according to the curriculum of ecology jointly coordinated by the Chair of Biology and the Chair of GeoEcology. It was approved by the University Council on 16.03.1992 (accredited in 1998; field of research evaluated in 2000). The objective is to train highly qualified biologist-ecologists who would be able to do independent scientific or applied research or can

work in research institutions or as environmental specialists in the public or private sector.

The goals of the curricula of biology in Bachelor's studies coordinated by the Chair of Biology, based on the aforesaid, are, first and foremost, the provision of **foundation education in biology** and after the completion thereof degree studies according to the national priorities as set above. **The curriculum places more emphasis on the versatile foundation education in natural sciences and integration of natural sciences as compared to the Bachelor's programmes of biology at the University of Tartu.** The curriculum includes e.g. Hydrology and Marine Physics, Modelling of Marine Systems, Stochastic Methods in Biology, Environmental Impact Assessment and Environmental Audit, Management of Marine Resources, ISO 14000 and EMAS Environmental Management Systems, Environmental Monitoring, Water Treatment and Purification. Within the development process disciplines on nature of the Baltic coastal areas and their research have been introduced, e.g. Biomonitoring of the Coastal Sea, Field Work in Marine Biology, A Sustainable Baltic Region, Baltic Sea Environment, Life in the Baltic Sea, and others which are taught to a lesser extent or are missing in the curricula of University of Tartu.

The Master's programme puts stress on marine biology and other related sub-disciplines of biology.

Therefore, the studies in marine biology must be considered a characteristic trait of both curricula to be accredited.

The curriculum development places emphasis on systematic approach, problem-based studies and critical thinking which provide the graduates with good opportunities in the labour market.

The description and syllabi of the curricula to be accredited are made public on the TPU website (www.tpu.ee/oppeinfo/index.php) and in Appendices 9-14.

The curricula are in conformity with the Law of Universities (RT I 1995, 12, 119), the Higher Education Standard (RTL 2002, 56, 348) (Appendix 15) and the Statutes of Tallinn Pedagogical University (registered by directive No 824 of 15.09.2003 by the Minister of Education and Research). Admission of students takes place according to the state commission. There are student places for fee-paying students, the corresponding number is approved by the Council of the University.

2.2. Elaboration and Development of Curricula

The following procedures are set up in Tallinn Pedagogical University (TPU) to prepare curricula and assure quality of studies:

- The Council of the University makes a decision concerning opening of a curriculum at a particular higher education level.
- The academic department coordinating the corresponding major prepares a draft curriculum.
- External experts and research and the academic commission of the board of the university assess the draft curriculum.

- The board of the faculty makes the proposal to the Council of the University to approve the curriculum and submits it to the the academic commission of the board of the university.
- The the academic commission of the board of the university analyses the conformity of the curriculum with the general requirements.
- The Department of Academic Affairs reviews the draft curriculum.
- The university submits an application of acceptance of the curriculum and for inclusion of figures of admission to the Ministry of Education and Research.
- The list of fields of study and curricula and admission quotas of the university are formalised by order of the Minister of Education and Research with regard to the Law of Universities Article 22 (5).
- The curriculum is entered in the Estonian Register of Curricula kept in the Ministry of Education and Research.

The head of the curriculum enters running changes and amendments in the curriculum, involving therefore the whole academic department and the teaching staff of the chair coordinating the curriculum. The head of the curricula of Biology is Assistant Professor Margus Harak. **The curriculum is approved by the board of the department, board of the faculty and finally, the Council of the University.**

The Department of Natural Sciences observes the following principles in preparation of the curricula:

- The choice, number and volume of subjects of the curriculum must be sufficient to allow the students achieve the applied qualification.
- The structure and content of the curriculum must correspond to the up-to-date research standards.
- The curriculum must exceed the study material of the corresponding subjects of comprehensive school to the full extent.
- The curricula consider possible changes in the curricula of comprehensive school and the organisation of studies in the course of school reform(s).

Curricula are developed in cooperation with structural units of the faculty and other faculties, whereas the aim is to make maximum use of subjects of natural sciences and educational sciences taught within other curricula of the university. Student questionnaires provided by the university and staff have given important feedback information (Chapter 7.3.).

With regard to reform provisions based on the Bologna Convention, the 4+2 curricula are being modified into 3+2 curricula. Therefore curriculum development mainly concerns these curricula. The development output concerning the old 4+2 curricula is more modest as there is no admission.

The boards of the curricula follow the provisions of Regulation No 265 "Procedures of Accreditation of Universities and Institutions of Professional Higher Education and Their Curricula and Requirements for Accreditation". All 3+2 system Bachelor's and Master's curricula and doctorate programmes have the curriculum boards which consist of teachers leading the curriculum, teachers from other departments and representatives of employers, alumni and students. The curriculum board of the curricula of Biology includes:

Prof. Henn Kukk, Dean of the Faculty of Mathematics and Natural Sciences;

Ass. Prof. Margus Harak, Head of the Chair of Biology;
Prof. Leida Talts, Head of the Chair of Primary Education;
Dr. Georg Martin, Head of the Department of Marine Biology, Estonian Marine Institute of University of Tartu, Eurouniversity, Dean of the Faculty of Environmental Conservation;
Dr. Ain Lankov, research fellow of the Department of Fisheries Research of the Estonian Marine Institute of University of Tartu;
Triinu Tõrv, Bachelor student of Biology (Marine Biologist – Specialist on Environmental Subject), TPU.

Some subjects have been merged to meet the needs, some closed and some introduced, e.g. instead of the course *Higher Plants* there is now *Ecological Biochemistry*.

Curriculum development emphasizes modernisation, formation of more voluminous interdisciplinary curricula, more frequent use of interdisciplinary lectures and modular studies.

2.3. Biology (Marine Biologist – Specialist on Environmental Subject), Bachelor's curriculum (6420240)

The curriculum was opened by the resolution of Tallinn Pedagogical University (TPU) Council in 1997 and the admission of students lasted from 2000 till 2002. In connection with the transition to the 3+2 curricula system, admission onto the curriculum was finished.

The aim of the curriculum is to prepare biologists who have high environmental awareness, who are good at integrating different natural sciences and who can do research work on (marine) biology and environmental sciences

Admission requirements: secondary education; state exams: Estonian + two exams out of 5: biology, chemistry, physics, geography, mathematics. Professional suitability test (in two parts: an interview and professional suitability test in a written form on topics related to biology and other important social issues).

The graduates have been prepared to do research work and to continue their studies at Master's and then doctorate level. When a person takes up the teacher training program at Master's level, it gives him/her the profession of the teacher of biology in secondary school and the teacher of environmental sciences in basic school.

The volume of the curriculum is 160 credit points (CP) and the nominal duration is 4 years.

The general structure of the curriculum:

- general subjects (20 CP)
- lower, middle, and upper level subjects (82 CP)
- Bachelor's thesis (15 CP)
- open electives (3 CP)
- electives (10 CP)
- minor subjects (30 CP) (see Chapter 1.4. and Figure 5).

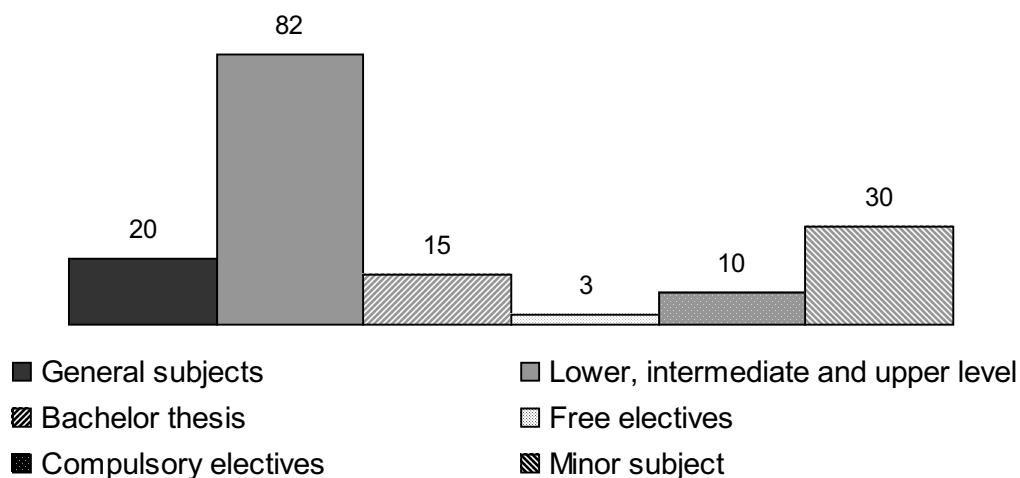


Figure 5. The general structure of the Bachelor's curriculum Biology (Marine Biologist – Specialist on Environmental Subject) (160 CP), code 6420240

The general subjects are: *Philosophy, Overview of Psychology, Overview of Sociology, Informatics, Foreign Languages (English, German or Russian) and Higher Mathematics*. The students from Russian-speaking schools also have a possibility to study Estonian as a general subject. At lower level the aim is to provide a systematic introduction to the speciality. The subjects at lower level are: *Botany, Zoology, Basics of General Geography, General Chemistry, Elementary Physics, Mathematical Methods in Natural Sciences*. The aim of the intermediate level is to give students systematic basic knowledge in their field of study (Appendices 9 and 12). The subjects taught at intermediate level are: *General Ecology, Field Work in Floristics and Faunistics, Estonian Life Communities, Microbiology, Genetics, Environmental Sciences, Plant and Animal Ecology, Field Work in Mycology, Molecular and Cell Biology, Hydrobiology, Human Biology, Plant and Animal Physiology, Theory of Evolution*. The upper level gives advanced knowledge and skills of subjects connected with marine biology and environmental sciences. The following courses are taught: *Algology, Term Paper I, Biomonitoring of Coastal Sea, Population Ecology, Ichthyology, Behavioural Ecology, Developmental Biology, Field Work in Marine Biology, Ecological Biochemistry, Basics of Environmental Protection, Management of Marine Resources, Term Paper II, Hydrology and Marine Physics, Modelling of Marine Systems, Environmental Impact Assessment and Environmental Audit, Environmental Management Systems, Bioorganic Chemistry, Environmental Chemistry, Stochastic Methods in Biology*. Electives provide additional advanced knowledge and skills in the same fields. The electives that can be chosen by the students are: *Human Ontogeny and Sexuality, A Sustainable Baltic Region, Baltic Sea Environment, Higher Plants, Entomology, Life in the Baltic Sea, Global Ecology, Statistical Methods in Natural Sciences, Environmental Monitoring, Water Treatment and Purification*. The aim of open electives is to create an interdisciplinary outlet between different curricula. Open electives can be chosen from among the courses taught in TPU but also in other universities. There are also two term papers (I and II) and a Bachelor's thesis in the curriculum to acquire the

habit to study and do research and to attain the methodology of research work. The topics of term papers and Bachelor's theses are picked together with the supervisors of the papers. The program ends with a Bachelor's thesis. The quantitative parameters of the studies of the curriculum are illustrated in Table 2.3.1.

The documents awarded at graduation: a diploma certifying the Bachelor's degree together with an academic report. The degree conferred: *BSc in Biology (Research Master in Biology)*.

Biology (With Second Subject), (3+2) Bachelor's curriculum (6420282)

Because of the higher education reform, the admission onto the abovedescribed 4-year Bachelor's curriculum stopped in 2002. This was replaced by a new three-year Bachelor's curriculum (6420282). But as its students have not completed two thirds of the study yet, this curriculum cannot be presented for accreditation. However, the description of the curriculum will be given below as it helps to understand the logic of the development of the curriculum of the department. The described curriculum is the descendant of the Bachelor's curriculum Biology (Marine Biologist– Specialist on Environmental Subject) (code 6420240) (see Appendices 10, 13)

The volume of the curriculum is 120 credit points (CP).

Admission requirements: secondary education; state exams: Estonian and two exams out of 4: biology, chemistry, physics, mathematics. Professional suitability test (in two parts: an interview and professional suitability test in a written form on topics related to biology and other important social issues).

The aim of the curriculum is to give basic knowledge in natural sciences and to help form high environmental awareness in order to continue one's studies at Master's level. The graduate of the Bachelor's program can work as a lab assistant both in secondary school and university, but also in research institutions and companies that apply biotechnology. When a student graduates from the teacher training program at Master's level, he/she has the right to work as a teacher of biology in secondary school. The recommended minor subjects are: Chemistry, Geography, Informatics, Physics, and Mathematics. The opportunities of students depend on the chosen minor. The completion of a minor at Bachelor's level will be realized when the student graduates from the teacher training program at Master's level– the latter giving him/her the right to teach the subject in basic school.

The general structure of the curriculum: 120 CP, which are divided into:

- general subjects 15 CP
- focus subjects 15 CP
- major 50 CP
- minor 30 CP
- open electives 6 CP
- Bachelor's thesis 4 CP (Figure 6).

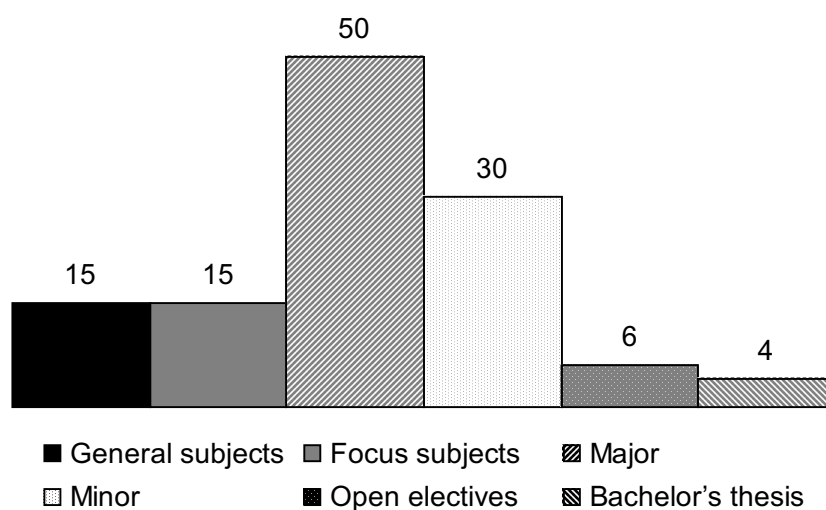


Figure 6. The general structure of the Bachelor's curriculum- Biology (With Second Subject) (120 CP), code 6420282

The aim of general subjects, interdisciplinary electives and focus subjects is to provide the students with a systematic introduction to the field of study and give basic knowledge. General subjects give a more general overview of natural sciences. The aim of interdisciplinary electives is to provide an overview and skills of subjects important from a comprehensive point of view. General subjects and interdisciplinary electives respectively are: *General Biology, Basics of General Geography, General Chemistry, Physical Picture of the World and Oral and Written Communication, Intercultural Communication, Computer-Aided Information Processing, Environmental Sciences and Education, Introduction to Public Administration, Information Sources and Retrieval, Coping Strategies in Modern Society, Psychology of Social Skills and Interpersonal Communication, Organisational Behaviour*. Focus subjects are: *Estonian Life Communities, General Ecology, Hydrobiology, Hydrology and Marine Physics, Mathematical Methods in Natural Sciences*. Students from Russian-speaking schools can study Estonian in addition if needed. The aim of major subjects is to give advanced knowledge and skills in subjects related to (marine) biology and environmental sciences. Major subjects are: *on A Sustainable Baltic Region, Botany, Zoology, Educational Sciences, Field Work in Floristics and Faunistics, Molecular and Cell Biology, Plant and animal Physiology, Biodiversity and conservation Biology, Genetics, Theory of Evolution, Plant and Animal Ecology, Field Work in Mycology, Developmental Biology, Inorganic Chemistry, Organic Chemistry, Biochemistry*. Electives provide additional advanced knowledge and skills in the same fields. The electives that can be chosen by the students are: *Life in the Baltic Sea, Applied Botany, Entomology, Environmental Impact Assessment and Environmental Audit*. In addition it is also possible to choose a course *Encyclopaedia of Law*, which introduces general law systems. The program ends with a Bachelor's thesis, which is compiled on a topic related to a major. The Bachelor's thesis is in the curriculum to help students acquire the habit to study and do research and to attain the methodology of research work. The topics of Bachelor's theses are picked by students together with the supervisors

of the papers (the volume of research work in a Bachelor's thesis is smaller than in the former 4+2 Bachelor's curriculum 6420240).

The quantitative parameters of the studies of the curriculum are illustrated in Table 2.3.1.

The documents awarded at graduation: a diploma certifying the Bachelor's degree together with an academic report. The degree conferred *BSc* in Biology.

In accordance with the study programs of minor subjects, the students pass the modules chosen by themselves (see Chapter 5.5. *The Workload and Academic Performance of Students*).

Table 2.3.1.

The quantitative parameters of the Bachelor's curriculum Biology (Marine Biologist–Specialist on Environmental Subject), code 6420240 (4+2) and Bachelor's curriculum Biology (With Second Subject), code 6420282 (3+2)

Parameter	Quantitative parameter		Analysis
	(4+2)	(3+2)	
Nominal duration (years)	4	3	A year shorter
Total volume CP	160	120	40 CP less
Degree conferred	<i>BSc</i> in Biology	<i>BSc</i> in Biology	The name of the degree is the same
Number of compulsory subjects	45 subjects	24 subjects	The number of compulsory subjects has decreased more than by half. (+)
Number of electives	4-6 subjects	2+10 subjects from the block of a minor	The proportion of electives has increased twice. (+)
Average volume of compulsory subjects CP	2,4	3,4	The average volume of compulsory subjects has increased by 1 CP (+)
Proportion of electives in the curriculum %	9,7	6,6	Because of the shorter duration of the curriculum the proportion of electives has decreased 30 % (+)
Proportion of practical work %	25,4	21,4	The proportion of practical work is almost the same (a small decrease) (±)
Structure of studies: lectures %,	55,1	51,7	The proportion of lectures is almost the same (a small decrease) (±)

seminars, exercise classes%	41,7	45,4	The proportion of seminars has risen (+)
research work%	3,2	2,9	The proportion of research work is almost the same (-)
Total number of exams	32	17-18*	Because of the noticeable increase in the volume of credit points the total number of exams has decreased (+)
Share of exam types:			The proportion of written exams has risen. (+)
oral and combined %,	41,8	34,2	
written %	58,2	65,8	
Ratio of auditory and independent work	5:6	5:6	The ratio of auditory work and independent work is almost the same

* - the number of exams in the curriculum depends on the chosen minor.

2.4. Biology, Master's curriculum (7420201)

The curriculum was approved by Tallinn Pedagogical University (TPU) Council on April 22, 1996. The admission of students started in 1996 (see Appendices 11, 14).

The volume of the curriculum is 80 credit points (CP) and nominal duration 2 years. The curriculum is the second stage of the 4+2 study system. Because of the transition to the 3+2 system, the admission to the 4+2 Master's curriculum will be stopped in the year 2004.

Admission requirements: a diploma or a Bachelor's degree in Biology or any other natural science + a combined exam on the topics covered in the curriculum.

The aim of the curriculum is to prepare qualified biologists – ecologists who can work as scientists or academic staff at universities, as teachers in secondary school, environmental specialists or employees in nature reserves. The degree conferred is a research degree, thus it serves as a prerequisite to enter doctorate studies.

The general structure of the curriculum:

- specialised studies 34 CP:
 - the compulsory subjects of the curriculum 6 CP,
 - the compulsory subjects of the study-line 9 CP
 - the electives of the curriculum 12 CP
 - specialised seminars and applied activities 7 CP
- general subjects 6 CP
- Master's thesis 40 CP

The methods of study used are lectures, seminars, independent work. The biggest emphasis is on the latter.

The studies provide the students with a detailed picture about the modern research trends and methods of the speciality and with skills to do independent research work and come up with innovative solutions.

The compulsory subjects of the curriculum (average volume 2.5 CP): *Advanced Ecology, Mathematical Methods in Biology*, Core electives: *Life in the Baltic Sea, Biosphere and Man, Biodiversity and Conservation Biology, Baltic Sea Environment, Plant Geography, Zoogeography, Endangered and Rare Species, Microbiology, Environmental Impact Assessment, A Sustainable Baltic Region, Environmental Chemistry*.

The opportunities of students realize themselves through specialization. The curriculum is divided into three branches: 1) marine biology, 2) animal ecology, 3) plant ecology. According to the curriculum the main branch is that of marine biology. But in order to broaden the choice for master students the branches of animal and plant ecology have also been added into the curriculum. Specialization is thus determined by the chosen subjects. The aim of the compulsory subjects of the specific field of study is, therefore, to give advanced knowledge and skills through specialization. Compulsory subjects according to the chosen branch are Plant Ecology: *Advanced Botany, Plant Ecology, Plant Ecophysiology, Basics of Soil Sciences*; Animal Ecology: *Advanced Zoology, Population Ecology, Introduction to Population Morphology, Evolutionary Ecology*; and Marine Biology: *Hydrobiology, Planktonology, Ichthyology, Hydrology and Marine Physics*.

The course ends with a Master's thesis, which is compiled according to the chosen field of study. The topics of Master's theses are chosen in cooperation with supervisors. Master's theses have to be based on scientific research activities, it is recommended to have some scientific articles published (Appendix 16).

The general structure of the curriculum is illustrated in Figure 7 and Table 2.4.1. The curriculum has been built up so that the biggest proportion is given to practical work (87%). Lectures make up 13%, exercise classes and seminars 16% and research work forms 71% of the curriculum. The total number of exams and assessments is 15, among them 67 % are oral or combined and 33% in a written form.

The documents awarded at graduation: a diploma certifying the Master's degree together with an academic report. The degree conferred MSc in Biology.

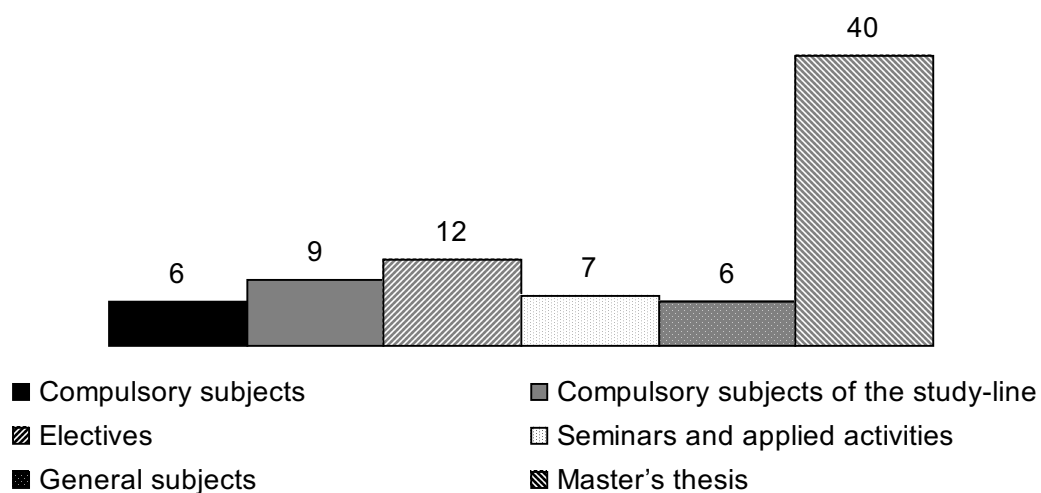


Figure 7. The general structure of the Master's curriculum - Biology (Ecology) (80 CP), code 7420201

Table 2.4.1.

The quantitative description of the Master's curriculum- Biology, code 7420201

Nominal duration (years)	2
Total volume CP	80
Degree conferred	MSc in Biology (Ecology)
Number of compulsory subjects	11
Average volume of compulsory subjects	2,5 CP
Proportion of electives in the curriculum %	15
Proportion of practical work %	87,3
Structure of studies:	
lectures %	12,7
seminars, exercise classes %	16,0
research work%	71,3
Number of exams	15
Share of exam types:	
oral %	66,6
written %	33,3
Ratio of auditory and independent work	1:5

2.5. National and International Dimension of the Curricula

Comparison of Bachelor's programmes is based on similar curricula of the University of Tartu, Helsinki University, Turku University, Joensuu University, the University of Hull, Justus Liebig University, Giessen. Also, corresponding curricula of US universities conducting studies in marine biology were reviewed (Tennessee State University, South Florida University and Central Florida University). We also used Susanne Charles's article *Biology at European Union Universities. Past, Present and Future*, Free University Brussels. (EUROBIO collection of articles "Colloquium on Evaluation in Biology", Toledo, 1995, and its Internet version at: <http://www.vub.ac.be/gst/eurobio/02Susanne.pdf> as a reference.

The curricula of all listed universities are divided into different levels. The Helsinki and Joensuu Universities use levels of a standard volume (*approbatur* 15 CP, *cum laude approbatur* 35 CP and *laudatur* 55 CP). In Tallinn Pedagogical University (TPU), University of Tartu and Turku University the levels are not that strictly fixed and they are further divided into elementary and intermediate levels, and the levels of general, elective and curricular subjects. Several British and Irish universities use a system where 3-year standard courses of elementary, intermediate and advanced subject levels (10-20 CP) are divided into major, elective (part of them recommended) and open elective subjects.

Students of Finnish, English (the EU in general) and a great many US universities specialise after completion of foundation courses and each field of study has a specific major module. In the University of Tartu a narrower specialisation is made possible via a choice of various modules (16 CP) in the 3-year Bachelor's studies. Students of TPU do not specialise in specific fields of biology through the choice of modules, their specialisation is expressed in the topics of their term and final papers. Their more concrete specialisation and corresponding subject selection only takes place in the Master's studies.

The universities being reviewed place an emphasis on different subjects and teach them on a different time scale. Due to the specific curricula to be accredited we have paid more attention to the curriculum or field of marine biology in the curricula mentioned above. The analysis shows that the subject content and stresses made are mostly identical. However, differences are expressed in subjects and open electives which cover local peculiarities. For example, the University of Hull has the following subjects in the corresponding curriculum: *Biological Oceanography*, *Neurophysiology and Endocrinology*, *Fisheries Resource Management*. Tennessee State University has *Fauna and Faunistic Ecology of Tidal Marshes, Beaches, and Sea Grass Beds*, etc.

The structure of Master's programmes at TPU is provided in Chapter 2.4. The general structure of the curriculum of hydrobiology at the University of Tartu is the following: *Colloquium in Hydrobiology for MSc Students* 10 CP, *Seminar in Hydrobiology for MSc Students* 4 CP, *Practical Training in Scientific Methodology in Hydrobiology for MSc Students* 10 CP, *Master's thesis* 50 CP, *Electives* 6 CP. The main difference is that at University of Tartu they do not have lectures in the curriculum.

The curriculum of Marine Biology is only taught at TPU in Estonia. Thematically closest but only partly overlapping analogous curricula are a Bachelor's curriculum

of Biology (6420201), Bachelor's curriculum of Hydrobiology, and a Master's curriculum of Zoology and Hydrobiology (7420210) at the University of Tartu. These curricula do not separately deal with marine biology and subjects are mainly limited to biology of fresh water organisms. Thus, there is no direct overlap of our curricula. Another, undoubtedly a major advantage of the TPU curricula lies in the close location of the Estonian Marine Institute of University of Tartu and its research bases.

Only six biologists work in the Chair of Biology, in addition, staff working on a contractual basis. Such a small number of specialists cannot cover many parts of the fields of biology. The emphasis of the curricula of Biology lies in the provision of a good foundation education in natural sciences with a focus on marine biology. The choice of minors, however, is extensive.

The Development Plan of the Department of Natural Sciences (until 2005) establishes: set up modern study and research laboratories of microbiology, establish the chairs of biochemistry, zoology and hydrology and botany and ecology on the basis of the current chairs of biology (and chemistry) by 2005, and more profound treatment of branches of biology (e.g. microbiology and cell biology) at TPU (Appendix 7). The plan also provides for the creation of an integrative research laboratory based on the chairs of the department by 2007.

2.6. Curricula-Related In-Service Training

The curricula focus on preparing specialists with high environmental awareness, and integrated knowledge in different fields of biology and other natural sciences, and also teachers by adding minor subjects and teacher training. Since so far there have been no graduates at the Bachelor's level, the Department of Natural Sciences of Tallinn Pedagogical University (TPU), proceeding from the specifics of the curricula has considered it purposeful to provide in-service training for teachers of biology and class teachers. In-service training is arranged through the In-Service Department of TPU. Participants are mostly teachers from Tallinn and northern Estonia but also from other parts of the Republic. It is essential that the in-service training enables to get feedback from teachers working at schools. This, in its turn, enables to evaluate the quality of curricula and make relevant improvements.

Due to the rapid development of computer network in recent years, in-service training via Internet has become a topical issue. Compilation of pertinent study materials and creation of interactive work environments has been started. Among other things, use is made of the web-based learning management system IVA, created jointly by the Centre of Educational Technology and Department of Informatics of Tallinn Technical University (see Chapter 3.1).

2.7. Analysis of the Curricula: Their Strengths and Weaknesses

Volumes of studies at different academic levels, i.e. Bachelor's and Master's studies conform to regulatory documents (see Chapter 2.2 Elaboration and Development of Curricula) and enable training of specialists at each level. The results of the questionnaire conducted among students in the autumn semester of 2003 show that the topics covered in the subject areas provide the knowledge and skills at the level

required from graduates (see Chapter 7.3 The Feedback of Students and Graduates on Their Studies).

The volume of problem-solving and research tasks in the Bachelor's programme of Biology (Marine Biologist - Specialist on Environmental Subject) (4+2 system) is at an almost optimum level (18%). The quality of specialist training in research can be raised by increasing the volume of independent research, but we should consider other aspects of output as well, i.e. practical and theoretical skills concerning tasks other than research.

The Master's programme in Biology also has an optimum ratio of problem-solving and research tasks. In the curriculum of the 4+2 system providing research master's degree the volume of independent work and research accounts for about 87.3% of the curriculum. The goals of training research masters being considered (biologists-ecologists are prepared to work as qualified research fellows or university teachers, teachers of upper secondary school, specialists of environment protection or nature reserves), the total volume of independent research is well grounded. All 22 graduates work in their area of specialisation. Four of them work in the Department of Fisheries Research and six in the Department of Marine Biology of the Estonian Marine Institute, twelve in other areas. 13 of all graduates (59%) continue studies.

More attention in the development of the curricula of biology (especially new 3+2 curricula) should be paid to the expansion of the range of fields (currently marine biology, botany and zoology). The expansion of topics has been inhibited by limited facilities required for studies and research. The development plan of the department proposes a solution to the problem concerning modernisation and improvement of study facilities – an establishment of an integrative research laboratory. Joint work with a number of research institutions within and outside the university is being intensified through cooperation projects. The department uses its current, fairly new rooms (P-210 and P-211) and redecorated rooms (P-401, P-406, *etc.*) for practical classes and independent work. It also has contracts to use facilities of other institutes (Institute of Ecology of TPU, Estonian Marine Institute of University of Tartu, Institute of Experimental Biology of Estonian Agricultural University, Institute of Chemistry of Tallinn University of Technology). There are contracts with several other institutions – Tallinn Botanical Gardens, Tallinn Zoological Gardens, and Estonian Museum of Natural History. Thus the above-mentioned problem is not any more an inhibitive factor to conduct Master's studies at a recognised international level in a smooth uninterfered manner.

The titles of the curricula to be accredited fully conform with their content and subject competences.

3. Study Process

3.1. Teaching and Learning Methods

The studies take place according to the curricula compiled for the speciality (see Appendices 9-11) and the Accreditation Standard S204 of the curricula of higher education institutions (Study Process).

For the continuous modernization of learning methods, Tallinn Pedagogical University organizes regular in-service training courses for the academic staff. For example in 2002 6 members of the academic staff in the Department used this opportunity.

Article 15.7 of the Statutes of Tallinn Pedagogical University enacts that in every five years a regular lecturer is entitled to a teaching-free semester with the preservation of the salary. This time can be used for raising one's qualification. The corresponding schedule for the next academic year is compiled every March.

Depending on the peculiarity of a subject, lectures and/or seminars and various forms of practical work (both individual and group work) are applied in the studies (e.g. *A Sustainable Baltic Region, Field Work in Floristics and Faunistics, Field Work in Plant and animal Ecology, Mycology, etc.*). Students can practise the compilation of academic reports and they have a possibility to present these and take part in different discussions. Fieldwork and field trips are applied in various subjects (*Field Work in Floristics and Faunistics, Field Work in Plant and Animal Ecology, Mycology, Field Work in Marine Biology*). Practical classes in the laboratory are used in different subjects of chemistry, physics and biology (*Botany, Zoology, Elementary Physics, Microbiology, Algology, Ichthyology, Hydrology and Marine Physics, Modelling of Marine Systems, Bioorganic Chemistry, Molecular and Cell Biology, Plant and Animal Physiology, Inorganic Chemistry, Organic Chemistry, Biochemistry*). The proportion of lectures is relatively big: in most subjects they make up 40-50% of the volume (except for individual practical classes and research work, where lectures make up 10 and 0% respectively). The highest proportion of lectures can be found in theoretical physics and in some theoretical disciplines of biology and geocology (*Stochastic Methods in Biology, Global Ecology, Theory of Evolution, Estonian Life Communities*).

Many changes in the study process have been caused by the frequent use of batch lectures (mainly in case of general subjects and interdisciplinary electives) and the use of cycle courses (*Field Work in Floristics and Faunistics, Field Work in Plant and Animal Ecology, Mycology, etc.*). The launching of batch lectures has hindered the successful organization of studies to some extent. In lectures with a big audience, the contact between the lecturer and the students is almost nonexistent. It may also bring about the skipping of classes by less motivated students and the drop of academic progress. The use of big lecture halls makes it impossible for students to communicate with each other too. In addition, the lecturer cannot orientate in the level of the students' prior knowledge and their peculiarities. As batch lectures are organized mostly at general and lower levels, the problem is not very serious. In connection with the predicted increase in the space of lecture halls in the main building of the university in 2005, the problem of the lack of middlesized auditoriums

will be solved. Thus, it will be possible to finish such batch lectures. On the other hand, batch lectures reduce the relatively big workload of the academic staff

The use of cycle courses (especially in case of fieldwork and subjects with a small volume of auditory work) has justified itself. In the future the Department plans to increase the proportion of cycle courses even more

Independent studies are promoted indirectly by the use of individual study programmes of students. Independent work is mainly determined by the interests of a student, but also by a possibility to develop one theme in detail, starting from an academic report and finishing with the compilation of a term paper and then a Bachelor's thesis.

The possibilities to use computers in study work have improved considerably. The data about the university's computer park is given in Chapter 4.1. *Infrastructure*. The computer skills of admitted students should meet the requirements established by the test of competences.

The Centre of Educational Technology and the Department of Informatics of TPU have jointly created a web-based study environment IVA (<http://www.tpu.ee/iva.html>). The basis of IVA is a pedagogic conception which is grounded on a modern socio-constructive treatment of study. According to this, studying is not only acquiring knowledge, but also constructing a personal knowledge base, creating one's own 'world of meanings' in an active and meaningful way. At the moment the Estonian e-university consortium is testing IVA with the intention to suggest this as an official e-learning platform for Estonian universities (<http://www.e-uni.ee/main.php>). In the Chair of Biology IVA is being used at the moment in the subject *Zoology*.

In conclusion we can say that the learning methods in the Department of Natural Sciences are modern, versatile and selected according to the taught disciplines and the aims of the curricula. In the past three years progress has been made especially in the transition to the integrated curricula. There is a tendency to increase the use of student-centred learning methods.

3.2. Assessment and Analysis of Academic Results

The assessment of the knowledge and skills of students is determined by the Tallinn Pedagogical University (TPU) Regulations for the Organization of Studies (Appendix 17). The methods of assessment are given in the curriculum and the syllabus and their aim is to objectively specify the acquired level of a student in a subject.

The performance of students is assessed continuously during the semester and/or at the end of a course with an exam or assessment. Assessment taking place during the semester differs by subjects. Usually regular tests or intermediate assessments are organized when a part of the subject has been covered. But also reports, projects and research work can be used to grade students. Practical work is assessed on the basis of the summaries (records) of the work done. The academic staff takes into consideration the schedule of students while determining the time of tests during the semester in order to avoid overlapping. The wishes of students are also considered when setting dates for examinations.

While assessing, the instructors pay attention to how students can use academic literature and study materials, how they can apply their knowledge (doing exercises, project methods, finding solutions to problems, etc.) and how they can synthesize the content of different subjects.

There is a multi-level analysis of the success and failure of students (instructors, the Chair, The Department of Natural Sciences, the Faculty – see Chapter 7. *Quality Assurance and International Relations*), which helps to determine the reasons for bad or good results. According to different reasons the teaching methods applied in the curriculum might be adjusted or improved (inefficient methods will be replaced by new ones which consider the principles of university didactics).

The type of an exam or other assessment (written, combined or oral) depends on a subject. The type of assessment (written or oral) is determined by the academic staff in the syllabus. At Master's level or when the number of the students who have registered for a course is small, an oral exam is still often used, but the share of written exams is gradually growing. There exist also combined forms (written and oral together). Examination questions depend on the syllabus and the material covered during the course and meet the aims of the subject. In case of a repeated exam, sometimes an oral form is used.

The subject is deemed to have been acquired after having passed the examination or assessment. The teaching staff may establish requirements (prerequisites for sitting examinations), which have to be made known to students at the beginning of the semester (during the first two weeks). Two dates during the examination session and one more date during the week before the next semester or another date during the week of independent work in mid-semester for taking an exam shall be suggested by the teaching staff and agreed upon with the participants one month before the examination session. All students who have registered to be the attendees of a subject have automatically registered for the first examination too. For later exams one has to register in the Chair at the time determined by the teaching staff.

Assessments are taken in the last lecture / seminar of the semester; exams in most cases are carried out during the examination session, which follows the study of the given subject.

The result of an oral exam or assessment will be announced on the same day, the results of written exams shall be made known within 10 days (usually 2-3 days later).

The system of assessing the performance of students in Tallinn Pedagogical University is based on a six-point scale, taking into consideration the percentage of knowledge (and it was applied in the study year 2000/2001) (Table 3.2.1.).

A student has not passed an exam or assessment if:

- he/she lacks the minimum knowledge of the subject (up to 50 % of the volume of the subject acquired),
- he/she used some external help,
- he/she did not show up for the exam,
- he/she did not answer.

Table 3.2.1.

Assessment system in Tallinn Pedagogical University

Knowledge of the subject	Grade in words		Grade in a symbol	
	In Latin	In English	former	present
Positive grade				
91-100 %	<i>cum laude</i>	Excellent	"5"	"A"
81- 90 %	<i>laudatur</i>	Very good	"4"	"B"
71- 80 %	<i>optime approbatur</i>	Good	"3"	"C"
61-70 %	<i>approbatur</i>	Satisfactory	"2"	"D"
51- 60 %	<i>sufficient</i>	Poor	"1"	"E"
Negative grade				
0 – 50 %	<i>non sufficient</i>	Fail	"0"	"F"

A student who fails to pass an exam has the right to take part into two re-examinations until the last day of the exam session of the next corresponding semester. But if a student withdraws from the last re-exam and registers for the course once again through Open University, he/she has the right to take the exam three more times.

According to the results of questionnaires carried out among students (see Chapter 7.3. *The Feedback of Students and Graduates on Their Studies*) we can conclude that the assessment of study performance is objective and the results reflect quite accurately the level of achievement of study objectives. The organization of exams is flexible and can be checked. There exists a special system settling protests. When evaluating the performance of students, the methods of assessment which develop social competences are used (oral exams, seminars, group work, etc.). When forming examination questions or exercises for students, it should be observed for the sake of objectivity that

- the student understands what he/she has to do;
- the student knows what and how his/her answers will be.

In order to ensure objectivity a three-level assessment system is often used (e.g. in subjects *A Sustainable Baltic Region; Entomology; Field Work in Floristics and Faunistics; Plant and Animal Ecology, Field Work in Mycology; Field Work in Marine Biology, Estonian Life Communities*): the objective assessment of a student to his/her own work, the assessment of co-students and the assessment of an instructor. The minus of the above-mentioned system is that it is difficult to be applied in case of big study groups. An important aspect in assessing is to determine the relative qualitative rise in the development of an individual (this approach is mostly used in subjects which require a bigger amount of independent work, field works, etc.).

According to the TPU Regulations for the Organization of Studies (Appendix 17) there exists a system for settling protests, which gives a student the right to protest about the result of an exam or assessment within 7 workdays after the announcement of grades. For that the student has to present a written application to the instructor of the course or the head of the department. If the student's appeal is

refused within 10 days, he/she can appeal further to the head of the faculty within two weeks and so on up to the rector. In the period of 2001-2004 there have been no such appeals by the students of the Department of Natural Sciences in TPU.

3.3. Organization of Studies

The academic calendar regulates the organisation of studies in general. It establishes the beginning and ending date of the semester, dates of examinations, registration for participation in courses, confirmation of the student status on the basis of study load and academic performance (Appendix 18).

The aim of the timetable is to optimise the use of rooms, and organise students' study load and time as evenly as possible. The timetable for the semester is made public on the notice board and on the website, and in the mailing lists of study groups and of the department a minimum of three weeks before lectures commence. The students who do not follow a standard curriculum thus have enough time to consult the academic counsellor. The teaching staff deliver the syllabi at the first lecture of the semester to the registered students. The syllabus includes the course outline, requirements, required reading, etc. The syllabi are available on the website during the semester. Changes, events and closing dates as well as assessment results are made public on the notice board on the third floor of the main building and the department's website.

Students participate in some lectures and seminars with students of other curricula e.g. geoecology, environmental management and physics.

Preparing timetables is complicated to some extent by insufficient numbers of classrooms. Completion of the new main building is expected to improve the situation considerably (Chapter 4.1 *Infrastructure*).

As we can see in Chapter 3.4 *The Statistics about the Study Process* a timetable is usually valid for one semester in all the curricula of biology. Stable timetables allow students coordinate the course of their studies and preparation of individual study plans. On the other hand, such timetables complicate uninterfered introduction of special modules (modular studies during the semester in other academic departments or universities) in the studies. Problems, however, are rare as the University of Tartu is the only university to use modular studies on a larger scale. Preliminary information on longer modules allows students prepare their individual study plans without major difficulties.

Study load during the Bachelor's and Master's studies is distributed to allow collection of just above 20 CP in the first and just below 20 CP in the last semester (in the Bachelor's studies open electives add 3-4 CP to enable collection of the required amount of credit points 160 (120) CP both in the 4- and 3-year programmes). Collection of more credit points towards the beginning of studies allows focusing on the final paper during the final semesters. In principle, the same system is applied in the doctoral studies.

The content of independent work of students and degree students is largely determined by research priorities of the university and demands of employers. Students' personal interest in the chosen topic is equally important, also the

opportunity to develop the topic starting with an academic report and continuing it through a term paper, Bachelor's, Master's and doctoral thesis.

Load of the teaching staff in supervising term papers, Bachelor's, Master's and doctoral theses may be unequal, as students may prefer some teachers to others.

Curricula of academic levels are integrated. Degree studies at the university refer to Bachelor's studies, studies based on the integrated curricula of Bachelor's and Master's studies, Master's studies or doctorate studies. The systematic and didactic structure is discussed in the chairs and the department and allows more or less even workload during the studies. In terms of the academic year and subjects the systematic and didactic structure of other curricula of the department is considered as well as timely teaching of prerequisite subjects. An unstable economic situation of the students is a major cause of discord. A large number, in 2003 close to 74% of Bachelor's students of Biology had to work along with their studies. In the Master's studies 100% of students work. Even though the national allowance system has been introduced (Chapter 5.4), unfortunately, the national policy of social guarantees to students does not allow studies without a hitch. Other, less inhibiting causes of discord are: students' little activeness in planning their studies, first-year students select subjects randomly, a relatively modest use of counselling and a practice to leave more demanding assessments and examinations (thus less popular among the students) until the end of the studies. Drawbacks become especially evident when students transfer from more strictly established foundation studies into a more freely organised stage of specialisation studies requiring more effort-making and knowledge. The analysis of academic progress shows that the studies of Bachelor students in Biology are mostly hindered by difficulties in higher mathematics. Cooperation with the Department of Mathematics has led to the final stage of preparation of courses of mathematics which better conform to the new 3+2 curricula and specific requirements of biology.

Integrated curricula enable students from other universities to transfer to TPU smoothly and without major difficulties (e.g. from the Faculty of Science of Tallinn University of Technology, the Faculty of Biology and Geography and the Faculty of Medicine of University of Tartu, Faculties of Agronomy, Veterinary Medicine and Forestry of Estonian Agricultural University, the Estonian Maritime Academy) and the other way round: several graduates of the curriculum of natural sciences who were not matriculated in the Master's programme because of their insufficient results at the admission competition, have proved suitable and successful in a number of Master's programmes of natural sciences of University of Tartu and Tallinn University of Technology.

3.4. The Statistics about the Study Process

BIOLOGY (MARINE BIOLOGIST – SPECIALIST ON ENVIRONMENTAL SUBJECT), BACHELOR'S CURRICULUM (6420240)

1. Number of weekly hours according to the timetable in a semester:

minimum	0 (8. semester), 16 (without 8.semester)
average	20 (with 8. semester), 23 (without 8. semester)

- maximum 32
2. Maximum number of subjects during one term: 10.
 3. Average weekly volume of independent work in hours: 20 (with 8. semester), 17 (without 8. semester).
 4. Size of groups during auditory work (found on the basis of the present III & IV year; only subjects of natural sciences were taken into account):

minimum	14
average	24
maximum	35
 5. The volume of written independent work given in subjects taught by the Chair during the studies: 11...12 (depends on the minor chosen by the student), 2 term papers and Bachelor's thesis are among them.
 6. Average duration of permanent timetable: semester.
 7. The quantity of study-books available:
 - a) the proportion of subjects without a study-book (or there are only 1-2 items in different libraries of Tallinn): 20 %;
 - b) the proportion of subjects with a study-book in Estonian, which can be freely purchased (or is available for anyone in a library): 64 %;
 - c) the proportion of subjects with a study-book in a foreign language for at least a quarter of the students: 8 %;
 - d) the proportion of subjects with a study-book for at least 1/5 of the students: 8 %.
 8. The percentage of graduates who finished in nominal time (calculated on the basis of the number of entrants in a respective year): no graduates yet.
 9. The percentage of graduates with *cum laude*: no graduates yet.

Biology, Master's curriculum (7420201)

1. The total number of specialized mandatory subjects- 6, which is 15 CP + general subjects (philosophy, informatics, foreign language) - altogether 3, which is 6 CP.
2. The rest of the subjects can be chosen and altogether they give 19 CP.
3. Auditory work takes place in general subjects – 9 lessons in a week (if taken in one semester).
4. Average duration of permanent timetable: semester.
5. The number of graduates - 22. The percentage of graduates who finished in nominal time: 33 %.
6. The percentage of graduates with *cum laude*: 56 %.

3.5. Field Work

The Bachelor's curricula in Biology address the following field works: MLB 1071 Floristics and Faunistics, MLB 1314 Marine Biology, and MLB 1211 Animal and Plant Ecology, Mycology. During the field practice the students learn to identify and herbarize plants and to prepare animal collections for scientific purposes. They also study fungi *in situ*. Selecting geoecology as the second subject, they also have to pass MLG1301 Field Work in Geoecology, where they are introduced with different types of landscapes, soils and wetlands. In all cases, the students are trained to

work in real natural conditions. The places for practice have been selected in areas with different soil cover.

The aim of field studies is to practice work in real field conditions and to provide future scientists, specialists on environment, teachers, etc. with knowledge and skills they would need in their future activities.

Field works are arranged in cooperation with local governments, schools, nature reserves and other institutions and organisations (e.g. State Forest Management Centre *etc.*). As a practical output of the field practice, these institutions get information on the natural resources of the area.

The methods and scientific level of field work meet international requirements. The equipment and methods used in field studies are steadily supplemented. GIS - geographical infosystems (GPS + personal computer) are used.

The curricula have been compiled considering local natural conditions and their scientific study. Due to the shortage of financial means both at the university as a whole and in the department it is not possible to arrange field practices outside Estonia. And this is a disadvantage. Hopefully, the situation will improve when Estonia joins the European Union (on May 1, 2004) and the priorities of the educational policy will be changed. We hope that the geographical range of field studies will widen considerably. So far, research projects for students in the Baltic Sea region arranged within the frames of the Baltic Sea University Programme have been of certain help.

As to Master's studies, this problem has already been solved. MSc students participate actively in the fieldwork and expeditions arranged by different institutes.

4. Study Environment

4.1. Infrastructure

The total area of the rooms at the disposal of the Department is 1379 m²; of that 1179 m² are lecture rooms. Laboratories take up 513 m² (228 m² – at the Chair of Physics, 160 m² – at the Chair of Chemistry, 125 m² – at the Chair of Biology).

Lecture rooms. There are three lecture rooms with a total area of 153 m² fixed to the department. The lecturers of the department also use these rooms to work with students of other curricula. In the Department of Natural Sciences part of the lectures are held in the general lecture halls of the university and in the lecture rooms of other departments. The total area of the lecture rooms in general use at the Department of Natural Sciences is 1038 m²; the three largest ones – 346, 207 and 122 m², respectively.

In connection with the rapidly increasing number of students in Tallinn Pedagogical University, the shortage of lecture rooms (especially large ones) has also increased. A solution will be the new building the construction of which will be started in 2004. In 2006, the Faculty of Mathematics and Natural Sciences will get the whole main building at its disposal. Besides, in 2004–2006 the general lecture rooms of the department will be repaired and up-dated.

Laboratories. In 2002, two new laboratories were equipped and opened: the laboratory of molecular and cell biology at the Chair of Biology, and the laboratory of organic and biochemistry at the Chair of Chemistry. In 2003, the laboratory of inorganic and analytic chemistry was repaired and up-dated; two laboratories of physics were reorganised. In 2004, the laboratory of classical botany and zoology was repaired and up-dated.

Due to the specific goals set up by the curricula to be evaluated in biology, besides the laboratories and lecture rooms in the main campus, the equipment and rooms of the Institute of Ecology at Tallinn Pedagogical University, and also in several other scientific institutions – Marine Institute of University of Tartu, Institute of Experimental Biology at Estonian Agricultural University, Institute of Chemistry at Tallinn Institute of Technology, Tallinn Botanical Gardens, Tallinn Zoological Gardens and Tallinn Nature Museum – are also used.

Based on this, we can claim that compared to the other universities in Estonia we have the best conditions for Bachelor's and Master's studies and research in Biology at Tallinn Pedagogical University. Particularly, in marine biology (see Chapter 2.5).

Computer classes. 8 hours a day, seven days a week, two computer classes with a total of 50 computers are open for students. Besides, there is the department's computer room with 12 computers, and it is also possible to use the 23 personal computers and laptops available at the chairs.

For lectures and seminars, computer and audio-video technology together with four data/video-projectors at the disposal of the department (or presentation screens belonging to the general property of the university), overhead projectors with slide sets, different kinds of model and distribution materials and web-based materials, *etc.* are used. The nomenclature of presentation technique will be widened in the nearest future. Lecture materials are available in the Internet in the university data

bank or on personal home pages of lecturers and on subject lists. The students can get material for copying. The computer systems are connected to the network of Tallinn Pedagogical University. Internet-connection exists.

Only licensed software is used at the department. The most widely used programmes are: *Interactive Physics*, *Science Workshop*, *Mathematica 4.2*, *MapInfo Professional 7.0*, *Cell Biology Interactive*, *SPSS 10.0*, *Test Point 10.0*, etc. Cooperation with the Department of Informatics has provided a possibility to use specific licensed computer software (*Adobe Photoshop 5.5*, *Adobe Illustrator 8.0*, *Macromedia Flash 5*, *CorelDraw 10*, *CorelDraw Graphics Suite 11 Academic*, *Macromedia Generator 2*, *Java2 SDK 1.4.0*, *Mathematica 4.1*, *Ghostview 4.2*, *Ghostscript 7.04*, *MikTex 0.98*, etc.). Access is available to several internationally acknowledged bibliographical data banks – *EBSCO Hosting*, *OCLCi FirstSearch Service*, etc.

Personal computers at Tallinn Technical University use *OpenOffice 1.1.0* software and *Windows* and *Linux* systems. To keep pace with the rapidly advancing technology, the software and ICT is steadily updated both at the university as a whole and in the department. It is planned to introduce the newest software – *Statistics*, *Statistica*, *AutoCAD*, *Thematic Mapper* etc. To sum the above-mentioned up, it may be said that from the standpoint of the curricula, the ICT-park as a study environment is at a high international level.

Most of the students have a computer at home. There is Internet-connection at the hostel.

Equipment. The devices obtained during the last three years are as follows: Chair of Biology – a new epifluorescence microscope Zeiss Axioskop, 10 microscopes Novex 86.010, GFL Shaking Incubator 3032, digital Eppendorf thermostat TDB 120 Biosan, centrifuge Heraeus, two devices Vortex VN 4. Laminar Telstar Bio-II-A, etc. (for more detailed information see Appendix 19). The Chair of Chemistry – freeze-drying system Drywinner 1–60, vacuum pump RZ2, refractometer Refracto 30P Mettler, pH-meter Mettler, etc. The Chairs of Physics have obtained several devices for atom and radiation laboratories. A remarkable progress has been made in digitalising scientific and teaching aids and in advancing the ICT-technology-based control.

At the university, everybody can make copies of study materials at the library or in the publishing department, in the academic departments and at all chairs.

The state of rooms meets the health protection and safety requirements brought out in different legal acts (Law on Public Health, RT I 1995, 57, 978; 1996, 3, 56; 49, 953; 1997, 37/38, 569; 1999, 30, 415; 88, 804; 2001, 23, 128; Health Protection Requirements at Schools RTL 2000, 86, 1286; Health Protection Requirements for School Timetable and Teaching Regulations RTL 2001, 43, 602 and Health Protection Requirements for Computer Courses and Public Use of Computers RTL 2001, 73, 993). All the rooms used for teaching purposes are provided with up-to-date equipment.

Both the university as a whole and the Department of Natural Sciences has competent personnel keeping the study environment in order, developing and repairing it.

The above-mentioned shows that we have a good potential for carrying out scientific work, for teaching at an acknowledged international level and for achieving the goals addressed by the curricula in Biology.

Compared to the situation four years ago, the teaching environment has considerably improved from the standpoint of the curricula of Biology. Updating of scientific and teaching environment is an ongoing process. There is an eight-year development plan for further improvement of the teaching environment and laboratory equipment. As a main goal, the plan addresses the creation of a common laboratory for the Department of Natural Sciences and its joint management (Appendix 7).

4.2. Library, Study Aids

The students and staff of the University may use the library of Tallinn Pedagogical University (TPU) (study library), TPU Academic Library, libraries of different chairs and the National Library. There is also access to libraries of other universities (Tallinn University of Technology, Estonian Agricultural University, University of Tartu, Estonian Academy of Music, Estonian Academy of Arts, etc.).

Both employees and students have access to several internationally acknowledged bibliographical databases – *EBSCO Hosting*, *OCLC FirstSearch Service*, *Oxford Scholarship Online*, *ISI Web of Knowledge*, quoting databases *Web of Science*, databases of patents *Derwent Innovations Index*, databases of the impact factor of magazines *Journal Citation Reports* and *ISI Essential Science Indicators*, etc.

Students have a possibility to use reading rooms, borrow books, visit different branches of the library, use the interlibrary loan service, reference and information services, and electronic databases (EBSCOHost, Science Direct, IOP, Kluwer Online, Oxford Reference, Cambridge University Press, etc.). Students have access to the network of Estonian libraries, the joint database of which describes the items of all participating libraries. Usage and booking of these volumes is available via Internet.

The amount of academic literature connected with natural sciences is larger in TPU Academic Library, for at the end of 2003 there was the joining of libraries and TPU Study Library became the library of social sciences and study literature, Academic Library remained orientated to mathematics and natural sciences.

The Academic Library of Tallinn Pedagogical University (former Estonian Academic Library) is a public science library where in the development of collections and services the main attention is paid to satisfying the information needs of scientists and lecturers. So it primarily supports research and development activities as well as academic education. It is important to provide undergraduates, Master and PhD students with information needed for their research work, and to support academic education. In 2002 there were 200 working spaces in the reading rooms, 2,256,989 items in the users' collection, 1,876,104 volumes of books, 114,267 yearly sets of scientific journals and popular-scientific magazines, 13,981 yearly sets of newspapers and 20,630 readers. As a scientific central library in the field of natural sciences (decree 12.12.1994 No 19 of the Estonian Minister of Culture and Education), exhaustive original and mediative information about natural sciences is

collected, maintained and made available. The library has to fulfil the tasks of the catalogue centre of items related to natural sciences and the tasks of the centre of interlibrary loan service in the same field. The interlibrary loan service is regulated by a decree of the Minister of Culture and Education (04.01.1995 No 1). All students of TPU, post-graduates and employees are entitled to use all the funds of the library, including the service of home lending. **Thus we can say that the students, researchers and the academic staff have undoubtedly one of the best working conditions in the Republic for successful learning and research work.**

As additional services TPU study library offers printing, photocopying and scanning. The study library has 48 computerized working spaces (38 personal computers and 10 text terminals), 24 of which (15 PCs and 9 terminals) are for the visitors of the library. To all readers of the library is ensured the usage of items, access to electronic databases, information service and counselling by the specialists of the library.

The amount of books in the University's library has increased in years. On January 1, 2004 there were 279,000 items in the library. In addition there are 1,876,104 books in TPU Academic Library.

A large part of voluminous study-books of natural sciences (incl. biology) in foreign languages are presented in TPU Study Library as single copies and therefore are used mainly by lecturers. However, the use of these copies by students is always possible when subscribed. Speciality books in the Estonian language are more numerous in the library. Usually there is enough for each student. At TPU Study Library there are 11 titles of periodicals of natural sciences (Appendix 20). Students have a possibility to read such scientific journals and popular scientific magazines as *Nature*, *Science*, *National Geographic*. On January 1, 2004, the number of items connected with biology was 314 (38 of them published after the year 2000), chemistry 585 (56 published since 2000), physics 931 (71 published since 2000), geography 844 (48 published since 2000), in total 2,674 items, of which 213 have been published since 2000. In addition to these volumes, there is also the growing number of books connected with environmental sciences.

Since 2004 80% of the funds of scientific literature in the Academic Library is completed according to the wishes of academic staff and scientists.

TPU Academic Library in co-operation with TPU Study Library, National Library and the academic structural units of TPU have launched the system of expertise and counselling of the completion of library funds.

In addition, study literature of natural sciences can also be found in different chairs of the Department of Natural Sciences. According to the agreement with TPU Study Library curriculum-related literature is concentrated in every chair. All chairs also have the right to order new items of academic literature into the library. It is possible to deposit items of academic literature from TPU Academic Library in different chairs too.

Main study-books of the subjects taught in the Chair of Biology are presented in Appendices 12-14. In addition to these, most of the study materials compiled by the academic staff of the Chair are available to students (as rtf, pdf, html, doc and psf files).

4.3. Everyday Life at Campus

2 cafe-canteens with the total area of 650 sq metres are at the disposal of students and academic staff. These allow 220 people to dine at the same time. Separate catering is enabled in 3 rooms, the surface areas of which are 8 sq m (in the main building) and 30 sq m and 15 sq m (in the language building)

In students' spare time they have access to 3 gyms (sportgames, aerobics and gymnastics) and a fitness centre with locker rooms and showers.

At university's disposal there are 2 training - recreation establishments, which can accommodate 290 people (200 at Värskä and 90 at Vana-Otepää).

Students have many possibilities to participate in the work of curriculum unions, hobby groups (music, art, dance, sport, *etc.*), student corporations and associations (http://www.ee/www/Haridus/Ulikoolid/Korporatsioonid_uliopilasorganisatsioonid/) but also in the Student Board (www.tpu.ee/editmode/esindus/Lingid.html). A large part of students of natural sciences, including students of different curricula of Biology, post-graduates and academic staff participate actively in the work of the Estonian Students' Environmental Protection Union Sorex (www.sorex.ee)

At Tallinn Pedagogical University the accommodation service is dealt with by the institution "Elamu" that is formed on the basis of the university's dormitories (59 Pärnu Road, 17 Karu Street, 15 Karu Street and 8 Raadiku Street). Ensured with accommodation are: a) primarily students of TPU; b) participants of in-service training and distance learning; c) guest lecturers and other guests of TPU; d) students of other universities; e) others

According to the assessment of the level of service units present in other European universities, the conditions offered in Tallinn Pedagogical University can be considered satisfactory.

4.4. Financial Resources

The University Council approves of the University budget, which contains financial resources allotted to different faculties. The faculty approves of the faculty budget, in which financial resources are divided between different departments. The annual budget of the Department is confirmed at the meeting of the Council of the Department. The Head of the Department is responsible for financial matters. In 2003 the budget of the Department of Natural Sciences was 6,209,000 EEK, including 4,824,000 EEK from national resources (so-called A-budget) and 1,385,000 EEK from its own resources (so-called B-budget). Expenditure for wages made up 83.7% of the budget, equipment was bought for 0.67 million EEK (10.7%). Budgetary expenditure per student is 14,643.9 EEK. Balance expenditure of equipment per student is 19,804 EEK. The cost of a not state-funded student place per annum in 3+2 Bachelor's curriculum is 20,000 EEK and 4+2 Bachelor's curriculum 16,000 EEK. In the coming years this amount needs to be raised significantly because of inflation.

One of the possibilities to increase financing is to raise the cost of statefunded and not state-funded student places. But this is complicated due to limited resources of students and the state.

5. Students

5.1. Admission to Different Specialities

Admission to the University takes place as a public contest according to the Regulations of the Organization of Studies in Tallinn Pedagogical University (TPU) (27.10.2003) and meets the requirements of the Accreditation Standard of Curricula S202 (Students) (Appendix 17). The number and cost of student places formed on the basis of state funding are determined by the Estonian Ministry of Education and Research. It finances the cost of student places till the end of the nominal duration of studies. The division of student places is confirmed by the Rector of the University according to the proposal of the Dean of the Department. The number and cost of student places formed outside the state budget are set by the University Government. Studies are paid for by an individual or a legal entity that has ordered the student place.

All individuals with secondary education have an equal opportunity to apply for the Bachelor's curricula of the University. To apply for the Master's curricula the candidates holding a diploma or a Bachelor's degree in Biology or other natural sciences have also equal opportunities. Those wishing to apply for doctoral studies should have graduated from a Master's curriculum in biology, ecology or other natural sciences.

Criteria for the already finished admission of Biology (Marine Biologist– Specialist on Environmental Subject) (curriculum 6420282) and the admission in the past two years of Biology (With Second Subject) (curriculum 6420240) are the same. Students are accepted according to the ranked order of the results. There are preconditions in order to apply for Bachelor's studies in Biology: state exams in the Estonian language and in two subjects out of four: biology, chemistry, physics, mathematics. Grades are converted into a 10-point system. In addition to the above-mentioned there is also a professional suitability test and interview. The admission to Master's studies comprises of a complex exam. There is no entrance exam in applying for doctoral studies. Competition regulations apply to all mentioned curricula.

Admitted students who have graduated from foreign-language secondary schools and have not taken the state exam in Estonian or whose results were under 60 points will be obliged to prove their knowledge in the Estonian language. Three possibilities exist for that: first, to provide the Dean's office with a certificate of the accomplished exam in the Estonian language at least at intermediate level (issued by the State Exam and Qualification Centre); secondly, to take the test in TPU Language Centre and get the necessary certificate; thirdly, to study the Estonian language for one academic year and at the end of the year provide the Dean's office with the document proving one's language skill (either the certificate from the State Exam and Qualification Centre or TPU Language Centre). Within the past four years, 8 students from Russian-speaking schools have been admitted. As the precondition of Master's studies is a diploma or Bachelor's degree – there have not been any students who have not taken the exam (although there has been one Master student whose native language was not Estonian).

Admission requirements and regulations are available for everyone on the website of TPU (www.tpu.ee) and every year in the specially published brochure for entrants. Information about admission requirements and short descriptions of specialities are given also in bulletins and TPU newspaper, which are delivered to potential entrants before state exams. Besides, in the spring semester there is an information day introducing different specialities and various education fairs are organized, like *Intellektika* (in Tartu) and *Teeviit* (in Tallinn). Promotion is done also at teachers' conferences and in mass media.

Admission quotas at Bachelor's and Master's level meet the state commission determined by the Ministry of Education and Research (see Appendix 21).

Admission to the Bachelor's and Master's curricula has been different throughout the years, depending on the state commission (Tables 5.1.1. and 5.1.2.). It was the biggest in 2002 – 16 and the smallest in 2001 – 10 students.

Competition at Bachelor's level has differed according to the year, from 7.1 in 2002 to 15.1 in 2001. In 2003 the competition was 9.5, and the results of the admitted students at their entrance exams formed 81.2 % of the maximum.

There have not been any students moving over to another university in the middle of their studies or coming to ours in the same way in the past four years.

Table 5.1.1

Admission of students to the specialities of Biology (Bachelor's level)

Year	Applications				Admission				Competition			
	4+2		3+2		4+2		3+2		4+2		3+2	
	SF	NSF	SF	NSF	SF	NSF	SF	NSF	SF	NSF	SF	NSF
2000	124	-	-	-	15	12	-	-	8,3	-	-	-
2001	151	-	-	-	10	8	-	-	15,1	-	-	-
2002	-	-	164	-	-	-	16	7	-	-	7,1	-
2003	-	-	133	-	-	-	14	16	-	-	9,5	-

* SF – state funded; NSF – not state funded

Table 5.1.2

Admission of students to the Master's studies of Biology (2000-2001)

Year	Applications		Admission		Competition	
	MSc		MSc		MSc	
	SF	NSF	SF	NSF	SF	NSF
2000	-	-	-	-	-	-
2001	-	-	-	-	-	-
2002	-	8	-	8	-	1,0
2003	-	11	-	6	-	1,8

The level of knowledge of student candidates meets the requirements set in the National Curriculum of comprehensive schools. A small difference in basic knowledge comes from a lower level of some secondary schools and their lack of study aids. In order to even out the level of students, members of academic staff

organize individual consultations and inform the students about available academic literature.

The admission of students to the curricula under discussion should be increased in the coming years, because there is a demand for the graduates of Biology throughout Estonia, especially in North Estonia. In many cities there is a need for specialists of biology in several research institutions and for teachers in comprehensive schools (according to the data of the Estonian Labour Market Board). Besides, the graduates' wide knowledge of natural sciences gives them an opportunity to blend into the regional establishments in charge of research work and thus makes it possible for students to be successful in the job market. According to the Statistical Office and the audit organized by the State Audit Office in 2003 ~30% of the teachers of natural sciences do not have corresponding higher education, 8 % of the teachers' positions are not filled and 35 % of the teachers of natural sciences are older than 50 years. Taking into consideration the needs and possibilities, the optimum admission quota for the Bachelor's curricula in the 3+2 study system in the coming years should be 20+5 students (state-funded + not state-funded places).

Matriculation of students is carried out during the week before the autumn semester on the basis of the Dean's proposal and by the order of the Rector.

5.2. The Composition of the Student Body

At present there are 35 students (SF 29 and NSF 7) studying according to the curriculum Biology (Marine Biologist – Specialist on Environmental Subject), 38 students (SF 28 and NSF 10) follow the curriculum Biology (With Second Subject) and 21 students (SF 2 and NSF 19) the Master's curriculum of Biology (Ecology).

Age composition. The age of students at Bachelor's level is mainly between 19–24 years. Only two students are older than 30. The majority of students (57.3 %) are 21-22 years old. Master students are between 26–29 years of age. Only 1 master student is older than 36. The majority of them (38.1 %) are 29-30 years old (Tables 5.2.1-5.2.3.).

Table 5.2.1

Biology (Marine Biologist – Specialist on Environmental Subject) Bachelor's level - age composition of students according to the year

Age	1. year		2. year		3. year		4. year		Total	
	SF	NSF	SF	NSF	SF	NSF	SF	NSF	SF	NSF
18-21	-	-	-	-	4	1	-	-	4	1
22-25	-	-	-	-	6	3	18	2	24	5
26-29	-	-	-	-	-	-	-	1	-	1
30-...	-	-	-	-	-	-	1	-	1	-
Total:	-	-	-	-	10	4	19	3	29	7
	-		-		14		21		35	
Average age	-		-		21,7		23,2		22,5	

Table 5.2.2

Biology (With Second Subject) Bachelor's level –
age composition of students according to the year

Age	1. year		2. year		3. year		Total	
	SF	NSF	SF	NSF	SF	NSF	SF	NSF
18-21	12	4	10	4	-	-	22	8
22-25	2	-	3	2	-	-	5	2
26-29	-	-	-	-	-	-		
30-...	-	-	1	-	-	-	1	
Total:	14	4	14	6	-	-	28	10
	18		20		-		38	
Average age	20,4		21,7		-		21,1	

Table 5.2.3

Biology (Ecology) Master's level –
age composition of students according to the year (together with the students who
were admitted before 2001 + students returning from their academic leave)

Age	1. year		2. year		Total	
	SF	NSF	SF	NSF	SF	NSF
18-21	-	-	-	-	-	-
22-25	-	2	-	2	-	4
26-29	-	3	1	8	1	11
30-35	-	-	-	3	-	3
36-...	-	-	1	1	1	1
Total:	-	5	2	15	2	19
	5		16		21	

Table 5.2.4

Biology (Marine Biologist – Specialist on Environmental Subject) Bachelor's level -
generic composition of students according to the year

Year	SF		NSF		SF+NSF		Total
	F	M	F	M	F	M	
1.	-	-	-	-	-	-	-
2.	-	-	-	-	-	-	-
3.	8	2	3	1	11	3	14
4.	14	5	3	-	17	5	22
Total	22	7	6	1	28	8	36

Generic composition. The majority of students of Biology at Bachelor's level (83.8%) are women, at Master's level females make up 81% of the students and at Doctor's level 80% are men (Tables 5.2.4.-5.2.6).

Table 5.2.5

Biology (With Second Subject) Bachelor's level –
generic composition of students according to the year

Year	SF		NSF		SF+NSF		Total
	F	M	F	M	F	M	
1.	11	3	4	-	15	3	18
2.	14	-	5	1	19	1	20
3.	-	-	-	-	-	-	-
Total	25	3	9	1	34	4	38

Table 5.2.6

Biology (Ecology) Master's level –
generic composition of students according to the year (together with the students who were admitted before 2001 + students returning from their academic leave)

Year	SF		NSF		SF+NSF		Total
	F	M	F	M	F	M	
1.	4	1	-	-	4	1	5
2.	-	1	13	2	13	3	16
Total	4	2	13	2	17	4	21

Table 5.2.7

Biology (Marine Biologist – Specialist on Environmental Subject) –
regional background of students according to the year

	Year				Total
	1.	2.	3.	4.	
Tallinn	-	-	7	10	17
Harju County	-	-	2	1	3
Pärnu	-	-	-	1	1
Pärnu County	-	-	-	1	1
Lääne-Viru County	-	-	-	1	1
Rapla County	-	-	1	2	3
Lääne County	-	-	-	2	2
Ida-Viru County	-	-	3	3	6
Viljandi County	-	-	1	-	1
Total	-	-	14	21	35

Tabel 5.2.8

Biology (With Second Subject) - regional background of students according to the year

	Year			Total
	1.	2.	3.	
Tallinn	9	6	-	15
Harju County	2	3	-	5
Pärnu	1	1	-	2
Pärnu County	1	-	-	1
Lääne-Viru County	2	1	-	3
Järva County	-	1	-	1
Võru County	-	1	-	1
Viljandi County	-	1	-	1
Valga County	-	1	-	1
Ida-Viru County	2	5	-	7
Tartu County	1	-	-	1
Total	18	20	-	38

Regional background. The students of Biology have come from almost all the counties and bigger cities of Estonia (Tables 5.2.7. - 5.2.9.). Most of the students at Bachelor's level come from Tallinn or Ida-Viru County – 52.5% and 14% respectively. The next in line at Bachelor's level are Harju County (11 %) and Lääne-Viru County (4 %). Although it is possible to study biology also in University of Tartu, some students from South Estonia (Valga, Põlva, Võru, Viljandi and Tartu County) have still chosen to continue their studies in TPU. 5 % of the students of Biology come from this part of Estonia. 80.8% of degree students are from Tallinn.

Table 5.2.9

Biology (Ecology) Master's level – regional background of students according to the year

	Year		Total
	1.	2.	
Tallinn	3	13	16
Harju County	1	3	4
Ida-Viru County	1	-	1
Total	5	16	21

The proportion of non-citizens among the students. The majority of the students of Biology are the citizens of Estonia. Only 2 students of Biology (With Second Subject) do not hold the Estonian citizenship: one of them is a citizen of Russia and the other's citizenship is undetermined. The degree students have so far all been Estonian citizens.

5.3. Student Counselling

Subject-systematic organization of studies creates more opportunities for students and therefore they need more information and counselling for decision making.

Student candidates. Counselling of student candidates takes place throughout the year. For that the admission department has been established. All the information related to admission is also available in the Internet on Tallinn Pedagogical University (TPU)'s website (www.tpu.ee). There is a brochure for student candidates which is published annually. Once a year, usually in March, information days for student candidates take place, where leading lecturers of the speciality introduce the learning conditions and potential possibilities for employment, as well as answer to the questions raised. To those who are interested, the laboratories and the members of the academic staff will be introduced. Information days are very popular among the candidates every year. There are also video introductions of the University and the Department. Specialities are also promoted in educational fairs *Intellektika* (in Tartu) and *Teeviit* (in Tallinn), teachers' conferences and mass media. Taking account all the above-mentioned information we can say that professional counselling is sufficient. The Career and Counselling Centre also consults student candidates.

Students. Students have a possibility to get sufficient timely information about the organization of studies. The initial counselling takes place in the subdivision of the taught speciality – in the Department of Natural Sciences and in the Chair of Biology that supervises the curricula. Students have the right to turn to the Dean's office, to the Department of Natural Sciences and to the members of the Student Board to get information related to their studies and to find solutions to their problems.

Counselling is based on documents regulating the organization of studies (the curricula; syllabi; Regulations for the Organization of Studies; regulations of the department, faculty and university's administration, etc.).

Counselling starts on the information day at the beginning of an academic year. Main structural units of TPU together with the department and chairs are then introduced to the students. An overview of the study process and the curricula are provided; the responsibilities and rights of students are introduced. On the information day students meet their supervisor-lecturer and tutor.

During the study period the counselling of students takes place regularly. The counsellor is available for students at certain times 4 hours a week. Counselling is also available on the phone and via e-mail. Issues that need counselling are primarily about the organization of studies and its different sides, like choosing major and minor subjects, drafting individual study plans and timetables, etc. Another aspect is related to learning difficulties and eliminating deficiencies in the studies

The academic counsellor consults all students in issues related to their curriculum, choosing their minor subject, composing an individual study plan. The names of academic and curriculum counsellors are available on university's web site. In the past few years the counsellor of the Department of Natural Sciences Has been Ms K. Räim, who is also the office manager of the department.

In the chair or lectureship – the subdivisions of taught specialities - there takes place the registration of students and issuing of assessment sheets, done by a clerk or secretary. The support staff counsels students in issues directly related to the organization of studies: timetable, questions related to lectures and lecturers, curriculum and its nominal division into academic years. Prompt information of the chair and department (e.g. transfer of lectures, changes in the timetable) is put up on the information stand of the subdivision and is forwarded to students via the mailing list. The support staff of the department also deals with the contracts of not state-funded students and issues related to their tuition. Students get their syllabi and curricula from the chair or the lecturer who teaches the subject. Lecturers counsel students in issues that are related to their subjects (selection of study materials, syllabus, requirements for exams / assessments, etc.). Outside lecturers students may turn to the head of the subdivision or members of the academic staff during their office hours.

Supervisors - lecturers (Ass. T. Ploompuu and lecturer Toomas Põld) are mediators and guides between students and lecturers and administration

The Dean's office of the faculty informs students about the recordkeeping of the results of studies, the status of a student and issues connected with scholarships. The Dean's office gives students the study card with the results of their studies each month (free of charge).

The Department of Academic Affairs counsels students about general issues connected with the studies and provides documents about the status of students.

First year Bachelor students are also counselled by a student tutor. The system of tutors has been working effectively in the department already for 5 years. The tutoring service of students in TPU is based on the Law of Universities (Article 42, etc.), the decrees of the Ministry of Education and Research *Requirements for Accreditation of University* (Articles 39...47, etc.), the requirements stated in the Higher Education Standard (S106, Articles 1, 4, 7, 9) and other documents that regulate the work of the university. The task of the tutoring service of students is to provide students with necessary information, to help them adjust socially and academically as well as to identify with the university on the level of student to student. The main aim of the tutoring service of students is to help them succeed both socially and academically (especially on the first year), to prevent academic problems, and in cooperation with the Student Board to develop university's traditions and democracy. Therefore, the task of tutors is to help the first-year students to adapt to the new study system, introduce the locations of chairs, libraries and other necessary subdivisions, help to understand timetables and counsel them in choosing their electives. Student tutors are senior students who have had the necessary training and have the right to counsel younger students within the limits of their competence. The names and contact information of tutors are available also in the Internet. The tutor in the curricula of Biology is Kristi Lukman, a fourth-year student.

The Student Board consults and protects students' interests in social and economic issues and their intellectual rights and interests. **The Student Board stands for the interests of students in the University Council, where they have a plenipotentiary member and in addition there is a representative from every faculty.** The chairperson of the Student Board is a plenipotentiary member of the

Board of the University. TPU Student Board is a member of the Estonian Students' Union (ESU) and has 4 members entitled to vote in ESU Council.

TPU Career and Counselling Centre (project manager Ms K. Laur) consults students about learning problems, professional suitability and career planning and coordinates the activities of tutors. Student candidates and school-leavers have a possibility to get information and consultations about specialities taught in the university as well as admission requirements.

5.4. Study Allowances

In connection with organizing the system of student loans and study allowances, there is a hope for the improvement of the economic situation of students. **National study allowances are nominated by order of the dean for one semester** and a student can be nominated for the allowance if he/she has completed a minimum of 75% of the study volume of the curriculum and his/her cumulative index is > 3,5. In the autumn semester of 2003 ten Bachelor students of Biology (Marine Biologist – Specialist on Environmental Subject) (average cumulative index 4.37) and 4 Bachelor students of Biology (With Second Subject) (average cumulative index 4.28) received a study allowance. The basic allowance at Bachelor's level in the autumn semester was 800 EEK. In 2003 no Master student of Biology (Ecology) received a study allowance.

Types of study allowances are:

- basic grant – a monetary allowance to cover costs accrued in the acquisition of education;
- economic allowance – a monetary allowance for those whose economic situation does not allow continuation of studies without financial assistance;
- supplementary allowance – a monetary allowance to cover the expense of accommodation and transportation;
- doctoral allowance – a monetary allowance to enable commitment to doctorate studies and research, and cover expenses accrued in the acquisition of education.

5.5. The Workload and Academic Performance of Students

Teaching is conducted on the basis of the curricula, taking into account the requirements presented in the accreditation standard S 205, which enacts rational use of students' time and creates prerequisites for achieving good results in the study process. As a basis for the organization of studies serve the Regulations for the Organization of Studies of Tallinn Pedagogical University which proceed from the decisions of the Council and Government of the University and are in agreement with the Law of Universities of the Republic of Estonia and the Standard of Higher Education of the Republic of Estonia (http://www.ekak.archimedes.ee/Korgharidusstandard_inglise_keeles.htm). The new teaching regulations of TPU were adopted in 2003. The document is available in the Internet. The academic calendar, according to which studies are organized, is presented in the reference

book given every year to those wishing to start their studies at the university (see Appendix 18).

The study load of students is regulated by credit points, the amount of which should be as equal as possible by years during the standard study period. The University has adopted the European Credit Transfer System (ECTS). One local credit point corresponds to 1.5 ECTS.

The curriculum 6420240 leading to the Bachelor's degree in Biology (Marine Biologist – Specialist on Environmental Subject) assumes that during a standard study period (4 years) the student gains 160 credit points. With the curriculum 6420282 at the Bachelor's level in Biology (With Second Subject) the standard study period is 3 years and the amount of credit points 120. To complete the Master's degree in Biology (curriculum 7420201) with a standard study period (2 years), the student must have 80 credit points.

In addition to a minor subject, the student who is studying at the Bachelor's level according to the curriculum 6420240 in Biology (Marine Biologist – Specialist on Environmental Subject) can choose open elective subjects in the volume of 6 credit points from the subjects taught at TPU or other universities (by agreement with the relevant department). Most popular are the English language and computer courses. According to the requirements set up at the university the command of the English language at the Bachelor's level must correspond to level B2 enacted by the European Council (<http://culture2.coe.int/portfolio>) and the computer skills to the level elaborated in the Department of Informatics, approved by the Council of the University and confirmed with the decision of the ViceRector for Academic Affairs.

Those, whose received at least 80 points for their state exam, do not need to take additional English courses. Besides, the students have a right to develop their foreign language command and computer skills outside the university and take the examination as an external student.

Proceeding from the selected minor subject (at Master's level from the study line), the curriculum and its standard division into years of study, timetable (see Appendix 22) and possibilities, the student compiles an individual study plan. The typical curriculum compiled in the Department serves as an example. The curriculum must be presented to the Dean's office by the date fixed in the academic calendar. Prior to that date the student has a right to change the curriculum. After the deadline the curriculum becomes compulsory and can be changed only by way of exception with the written consent of the dean and the head of the department. The compilation of an individual study plan is rather difficult because of the complexity of the curriculum and a great number of obligatory subjects. In 2003/2004 a typical curriculum was used by all BSc students of Biology and only by 30% of MSc students. The student can choose the subjects for his individual study plan only in case he has previously passed exams in obligatory subjects. Registration for subjects takes place at the relevant chair. There are two times for the registration: at the end of the previous semester, at the date enacted in the academic calendar or at the beginning of the next semester.

In order to graduate with a standard study period the student has to gain 20 credit points during a semester and 40 credit points during a year, as an average. The total amount of subjects taken during a semester must give at least 10 credit points. In

compiling a study plan one also has to consider that some subjects are not taught every year (that information is available in course descriptions).

At Bachelor's level the students study in their first year according to a typical curriculum. The proportion of class work is higher in the first and second year than in the last year. Thus, according to the 2000/2001 typical curriculum at the Bachelor's level in Biology (Marine Biologist – Specialist on Environmental Subject) the study load in the first year was the following: 1–2 semesters – 22 credit points, 3–4 semesters – 20 credit points, 5–6 semesters – 20.25 credit points, respectively, 7–8 semesters – 17.75 credit points (see Table 5.5.1). In the eighth semester the BSc thesis (15 CP) is compiled. Depending on the choice of the main subject, the study load of BSc students fluctuates within 1–2 credit points.

Table 5.5.1

The study load of students of Biology (Marine Biologist– Specialist on Environmental Subject) by semesters

Year of study	Academic year	Semester		Average
		Autumn (II)	Spring (I)	
I	2000/2001	23.5 CP	20.5 CP	22.0 CP
II	2001/2002	20.0 CP	20.0 CP	20.0 CP
III	2002/2003	20.0 CP	20.5 CP	20.25 CP
IV	2003/2004	17.5 CP	18.0 CP	17.75 CP

The share of individual work has increased by years since less class work is done. It varies with subjects and its approximate amount is given in each subject programme. The share of individual work at the Bachelor's level is greater than in the diploma studies. At the Bachelor's level in Biology (Marine Biologist– Specialist on Environmental Subject) individual work makes up 51.7%. At the Bachelor's level in Biology (With Second Subject) it depends on the second subject and ranges from 56.9% (second subject – chemistry) up to 64.7% (second subject – geoecology). The proportion of individual work at the Master's level is even higher (75–80%).

An account on the completion of the curricula is kept at the Dean's office of the Department of Mathematics and Natural Sciences. Assessment sheets (protocols) serve as a basis for assessment, showing the results of examinations and preliminary examinations. The assessment sheets are maintained in the Dean's office at least during the period twice as long as the standard period of the student's curriculum. Based on these sheets, the status and study load of the students are assessed. At the end of each semester, the study results are analysed and in accordance with the load of students teaching regulations are improved.

Some BSc students have difficulties in completing the curriculum, especially during the first three semesters (see Appendix 23). During the last three years, three BSc students were dismissed in a year, as an average. Among those, one due to an incomplete subject. So far, none of the students has been readmitted to the same curriculum. In the first year, the students drop out mainly because the basic knowledge they obtained at secondary school has remained superficial (the educational reforms concerning elementary schools and secondary schools have left "bottlenecks" in the quality of knowledge of natural sciences during the last two

years). Some students have not been capable of adapting to the study environment at the university. In older courses economic problems play an important role. Most of the students have to work (full- or part-time) in parallel with their studies. Several measures have been taken to improve the situation. First, more attention has been paid to analysing the academic progress of students. Secondly, the system of counselling has been made more effective (see Chapter 5.3). To follow the study results, relevant computer programmes and data banks have been introduced. Much attention is paid to development work to make the information in the Internet available to every student. With the problems related to inadequate academic performance the student may turn to the department's academic counsellor, to the lecturer teaching the subject or to the people working in the Dean's office. The academic counsellor follows the progress of the students, talks to them if necessary and agrees with the lecturer about the time of consultations. Besides, every lecturer has its reception hours when the student can turn to him/her with his/her problems.

Dropping out of students:

- 01.10.2000-01.10.2001. Biology (Marine Biologist – Specialist on Environmental Subject) (curriculum 6420240): 1 female student was exmatriculated due to an incomplete subject; 2 female students due to non-attendance in the programme and 1 female student due to the failure to pay a tuition fee.
- 01.10.2001-01.10.2002. Biology (Marine Biologist – Specialist on Environmental Subject) (curriculum 6420240): 1 female student was dismissed at her personal request.
- 01.10.2002-01.10.2003. Biology (Marine Biologist – Specialist on Environmental Subject) (curriculum 6420240): 1 female and 1 male student were exmatriculated due to incomplete subjects.

Thus, the total drop-out of students during the period of 01.10.2002 - 01.10.2003: 6 female students and 1 male student.

MSc students are successful in their studies and scientific activities. Evidence is derived from the publication of numerous scientific papers in different scientific journals and popular-scientific periodicals (see Appendix 16).

The drop-out of master students: in 2002 - 2 female students and in 2003 - 1 female student (they didn't register for studies).

5.6. Academic Mobility

Estonian Ministry of Education and Research implements the policy according to which the BA level programs have to be comprehensive and in accordance with similar programs of other Estonian universities. This is to allow extensive student mobility, especially after the Bachelor level is completed. At the same time to ensure the preparation of possibly wide range of high level specialist, needed for versatile development of Estonia, Master level courses in Estonian universities are not allowed to be considerably overlapping.

Therefore the students who have enrolled in Master level program at a certain university are usually not changing their home university until the end of program. Concerning the possibilities for every single student to take courses at other

universities, the compulsory part of our curricula takes only up to 50%, meaning that the students have good opportunities to take courses at other universities either in Estonia or abroad.

The options of mobility of students have been defined in the agreements between the universities and they depend on the preliminary studies of the students. At arrival of a student from another university the student counsellor compares the syllabi with these of the curriculum of Biology and fixes the subjects that can be transferred. The transfer will be made according to the decision of the member of academic staff responsible for the subject (who can demand acquisition of additional material when the volume or content of respective subject does not coincide). According to the agreements between the universities students can listen to certain courses at other universities (as visiting students). A visiting student is a student matriculated by another university, who according to respective agreements has gained a right to study one or several subjects at the given university whereby home university will transfer the results of the study.

The option of studying as a visiting student at University of Tartu, Tallinn Technical University, Tallinn Pedagogical University, Estonian Academy of Arts, Estonian Agricultural University and Estonian Academy of Music was established by the minutes of the meeting of the rectors of public universities on 17 September 1995 "Studying as a Visiting Student". Admission of visiting students and sending students to other universities as visiting students is determined by agreements between universities.

A visiting student has

- the right to participate in tuition on equal grounds with the students of receiving University;
- the right to use the library of the University;
- the right to reside in the hostel of the University on availability of vacancies;
- the obligation to abide by the regulations of tuition and house rules of receiving University.

The University has

- the right to prefer its own students to visiting students if number of course participants is limited;
- the right to terminate the studies of the visiting student if the visiting student has not abided by the regulations of tuition of the University and its house rules;
- the obligation to create for the visiting student conditions for the study of subjects indicated in his/her application.

Currently the students of Computer Science have been given a chance to apply various grants for studying at universities abroad, e.g. *SOCRATES* in the framework of subprogram of higher education *ERASMUS*, *DAAD*, *Baltic University Programme* etc.). The aim of the grants received is to develop cooperation in the sphere of higher education in Europe in order to increase professional qualification of people of participating countries. A period of studies abroad of the student is treated as an equal part of the curriculum at home university.

There have not been any students moving over to another university in the middle of their studies or coming to ours in the same way in the past four years.

In 2000 and 2002, during 3 months, two students from Turku Polytechnic (Finland) studied and had their procedural practice in the Chair of Biology of TPU, and 3 Master students of TPU stayed as visiting students in Turku. In 2002, during one semester, a student from the University of Turku participated in the studies of the Department.

5.7. Graduates of the Curricula

Due to the youth of the curricula of Biology, no students of Tallinn Pedagogical University (TPU) have graduated from the Bachelor' level yet.

22 students have been granted an MSc, 5 of them finished with *cum laude* (Table 5.7.1). The list of graduates together with the titles of their Master's theses have been given in Appendix 24. The students who have graduated from the Master's curriculum in TPU have all found work in the following research and educational institutions: Estonian Marine Institute of University of Tartu, Faculty of Forestry of Estonian Agricultural University, Institute of Ecology of Tallinn Pedagogical University, Estonian Museum of Natural History, International Student Office of University of Tartu, Estonian Control Centre of Plant Production, Estonian Meteorological and Hydrological Institute, Tõstamaa Secondary School, Estonian Radiation Protection Centre, Hiiumaa Islets Landscape Reserve, Transport and Environment Department of the City of Tallinn. Many graduates of the Master studies of Biology have continued their studies at doctorate level in Tallinn Pedagogical University, University of Tartu, Tallinn Technical University, University of Kiel (Appendix 24) (see also Chapter 7.3).

Table 5.7.1

Number of graduates since the opening of the Master's curriculum

Year	MSc degree
1997	6
1998	3
1999	1
2000	3
2001	3
2002	5
2003	1
Total	22

6. Academic and Administrative Personnel

6.1. The Personnel and its Workload

There are 34 teachers working in the Department of Natural Sciences., 25 of them are involved in the preparation of Bachelor and Master level students in Biology, i.e. the curricula 6420240, 6420282 and 7420201. In addition to them there are 3 part-time teachers that are connected to the curricula under accreditation. Therefore the total number, based on namely full positions, of teachers connected to the preparation of Bachelor and Master level students in Biology in the Department is 28. That means 21.25 equivalent full positions.

The teachers of the so-called traditional subjects of biology work fulltime for Tallinn Pedagogical University. New specific subjects are taught mostly by guest teachers or teachers who have a temporary contract. **Teachers from Tallinn Pedagogical University (TPU) Institute of Ecology, Estonian Marine Institute of University of Tartu and Tallinn Technical University are involved in teaching the special courses. At the same time our teachers are regularly involved in the work of other higher educational institutions** (for example, associate professor M. Harak and assistant lecturer T. Ploompuu also work in the Gene Technology Institute of Tallinn Technical University.)

The list of the academic personnel is given in Appendix 25. The administrative personnel of the Department of Natural Sciences consists of 8 people, which is 0.29 employees per teacher. Therefore the workload of the administrative personnel is quite significant. The relatively inadequate number of presently employed administrative personnel is about to grow in the next few years in connection with the structural changes foreseen in the development plan of the department. On the other hand, the professional approach of the administrative personnel makes up for the mentioned shortcomings.

Presented statistics show the academic and administrative personnel connected to both curricula under accreditation. As the Bachelor's curriculum (6420240) and the Master's curriculum (7420201) include also blocks of general subjects and interdisciplinary electives then the lists of academic personnel connected to them is presented in Appendix 26.

Most instructors (29, i.e. 93.5 %) (Appendix 25) **teaching subjects of natural sciences that belong to the curricula of Biology have a research degree.** 23 of them (74.2 %) have a PhD or an equivalent degree in science: DSc – 2, PhD – 9, Cand. Sci. – 13), 4 teachers have an MSc. The instructors at Master's level all have a PhD or its equivalent. Therefore the requirement presented in the documentation, that at least 50% of the teachers involved in Bachelor's level and at least 75% of the teachers involved in Master's level education must have a PhD or an equivalent degree, is completely met. The average age of the academic personnel is 49.7 years. The age composition of the teaching staff is given in Table 6.1.1.

The average continuous teaching service of the academic personnel is 12.3 years. 13% of them have more than 24 years of teaching experience.

Table 6.1.1

Age composition of the teaching staff of Biology
(in 2003)

	... - 40	40-49	50-59	60-69	70 - ...	Substantive employment	Equivalent employment
Professor	0	0	4	1	1	6	4,5
Ass. Prof.	1	4	2	3	1	11	8
Lecturer	2	1	0	0	2	5	3,75
Assistant	2	1	1	0	0	4	4
Teacher	1	0	0	0	0	1	1
Part-time academic staff	2	0	1	0	0	3	0
Total	8	8	6	6	3	31	21,25

The average annual auditory workload of the academic staff according to the position (see Table 6.1.2) meets the requirements given in Resolution 3 of TPU Government in 2002.

Table 6.1.2

Average annual workload of the academic staff

	Average weekly auditory workload	Average annual auditory workload	Preparation, exams/ assessments, correcting tests	Supervising professional placement and/or research work	Average total annual workload
Professor	5	160	240	400	800
Ass. Prof.	7	224	336	350	910
Lecturer (with research obligation)	10	320	480	310	1110
Lecturer (without research obligation)	14	448	672	200	1320
Teacher	16	512	768	150	1430

55.6% of teachers (15 individuals) work full-time, 33.3% (9 people) work half-time and 11.1% part-time (0.25 workload).

The average auditory workload of the teachers of natural sciences in 2003/2004 was 335 hours, 128.9 hours of that was spent reading for the students of the Department of Natural Sciences. In addition to auditory work the teachers are also occupied with supervising term papers, graduation papers and Bachebr's theses. 5 teachers are also involved in leading the department. In addition to that Prof. J-M. Punning is the Head of the Institute of Ecology; Prof. R. Mankin leads the Department of Natural

Sciences and Prof. H. Kukk is the Dean of the Faculty of Mathematics and Natural Sciences.

It is difficult to bring out the objective relationship between students and teachers when it comes to the curricula under accreditation, because the teachers involved in teaching Biology also teach according to different curricula in other departments and other faculties. According to the average auditory workload and taking into consideration their equivalent fulltime positions, we get 18.2 as the student-teacher ratio, of which the fulfilment of Bachelor's curricula is 94 and Master's curriculum is 2.6.

The strong sides of the instructors teaching the subjects of the curricula are:

- instructors are good specialists of the curriculum, having wide and versatile knowledge;
- teachers are involved in various activities according to their specialities within the university and also elsewhere;
- strong relations concerning scientific studies have been established between different scientific institutions and universities in Estonia and abroad;
- teachers are qualified for their specialities pedagogical-didactically and use modern educational technology and its means in their everyday work

The weak sides are: lack of administrative personnel as mentioned earlier; inadequate resources for the remuneration of specialists from elsewhere (supervising research work, writing reviews). But since 2003 things in this matter have considerably improved.

24 instructors of general subjects and electives (10.5 equivalent full positions), 13 with a scientific degree (see Appendix 26), are connected to the Bachelor's curriculum (6420240) and the Master's curriculum (74202019). 5 of them are doctors (PhD and Cand. Sci.), 8 have an MSc/MA. The average age of teachers is 39.7 years, average teaching experience 10 years. Their average auditory workload in connection with the general and elective subjects of the mentioned three curricula is 72.7 hours.

The relations between students, academic staff and other employees are good, based on mutual understanding and the code of academic ethics.

6.2. Personnel Policies

Academic personnel is chosen through a public contest according to the Law of Universities of the Estonian Republic, the Standard of Higher Education of the Estonian Republic (Appendix 15) and official documentation (election decree, etc.) established in Tallinn Pedagogical University (TPU). The basis for becoming elected is meeting the qualification standards of a certain position. The criteria for the choice are a candidate's level of education, scientific and teaching abilities as well as practical knowledge in the field. The most important criterion, however, is the productivity of the candidate's scientific work (the amount and quality of publications). Candidate's suitability for the position is first evaluated by a specially constructed assessment commission. The final decision is made by secret

ballot in the University or Faculty Council (depending on the rank of the position). A temporary contract (1 – 5 years) will be drawn up with the chosen employee.

The actual range of choice, when it comes to the academic personnel, is quite limited as the circle of suitable and compatible individuals in our small Republic is quite narrow. Limited financial resources minimize the possibility of inviting guest lecturers (from other universities and institutions). In connection with the rearrangement of the Master's and doctorate studies (increasing the amount of students admitted, raising student allowances, etc.) it can be hoped that the choice of academic personnel will widen in the future.

The administrative personnel in different Chairs (Appendix 5) have permanent contracts. The whole administrative personnel has got higher education. Additional schooling and vocational courses are regularly (1- 2 times per year) arranged.

The system of regular and specific (to the occupation) health check-ups and risk analyses is functioning in accordance with national Occupational Healthcare Regulations. First and foremost, the personnel working outdoors (as well as others) go through a series of vaccinations annually (for any diseases that can be connected to their occupation)

Some of the most essential orientations in the personnel policies of the Department of Natural Sciences of TPU for the coming years are:

- *To work out a support system to ensure the next generation of instructors and researchers, in cooperation with the partners of the University of Tallinn abroad.*
- *To establish joint professorships with other universities.*
- *To involve more visiting instructors in the studies, to introduce the system "Visiting Fellows".*

A constant policy of the department has been to raise the qualification of the academic staff and to increase the number of full-time instructors. But there is still no reason to be satisfied. A negative indicator is the high average age of the academic staff (ca 50 years) and the relatively big number of parttime teachers (at the moment the percentage is 41). At first the number of full-time instructors is limited because the capacity of subjects in the curriculum is small. The qualification of the personnel meets quite well the needs of the curricula, but still there is some room for development. Among the 29 full-time teachers in the Department 20 have got a PhD or a Cand. Sci. and 7 hold an MSc. The most successful in raising the next generation of teachers during the past five years has been the branch of geoecology, positive tendencies can be seen also in the Chair of Physics. But quite a lot of work in preparing new academic staff is still to be done. More opportunities should be found to send degree students to study in foreign universities for at least one semester. The number of young instructors and researchers might increase in connection with the planned improvement of the laboratories. The biggest change in personnel policies will be the creation of the position of a researcher (senior researcher) in Chairs – this is one of the most important prerequisites for the development of the Department. The average need for researchers is 2 full positions in each chair. The realization of this plan depends on two things: how quickly the laboratory park in the Department of Natural Sciences can be constructed and if there will be a breakthrough in the formation of competitive research groups in the nearest future.

6.3. Raising the Qualification of the Academic Staff

The lecturers of the Department take an active part in international conferences, seminars, symposia and summer schools. Participation in international scientific meetings is financed from Estonian Science Foundation grants and target projects. During the last three years (2001–2004), the lecturers of the Department of Natural Sciences attended 86 scientific conferences, seminars and symposia (Appendix 6).

Trips abroad with a duration up to 2 months have taken place within the frames of joint international projects. The lecturers visit other universities and scientific institutions. Meetings are arranged to discuss possible cooperation.

Young lecturers with an MSc degree are encouraged to continue their studies at doctoral level in other universities, e.g. Arno Põllumäe 1999–2004, Astrid Haljas 2001–2005, Tõnu Laas 1998–2002 at University of Tartu; Priit Reiska 1996–2002 at the University of Kiel, *etc.*

For the sake of steady modernization of teaching methods the University systematically arranges in-service training courses for lecturers. For instance, in 2002, 6 instructors from the Department of Natural Sciences used this possibility. Sometimes participation in the courses is difficult, because the teaching load of the academic staff is big enough (see Chapter 6.1). Article 15.7 of the Statutes of Tallinn Pedagogical University enacts that in every five years a regular lecturer is entitled to a teaching-free semester with the preservation of the salary. This time can be used for raising one's qualification. The corresponding schedule for the next academic year is compiled every March.

Scientific seminars are regularly held in the Department of Natural Sciences, its Chairs and in the Institute of Ecology. At these seminars ongoing investigations are discussed, and the newest world literature is introduced. Among the participants are also BSc and MSc students.

Among the part-time lecturers of the Department there are researchers, senior researchers or some other leading specialists (director) from several research institutions: Estonian Marine Institute of University of Tartu, Institute of Ecology of Tallinn Pedagogical University, Institute of Experimental and Clinical Medicine, Institute of Chemical and Biological Physics, Institute of Gene Technology at Tallinn University of Technology, Institute of Chemistry at Tallinn Institute of Technology, *etc.*

The development plan of the Department (Appendix 7) addresses the creation of a laboratory for interdisciplinary studies in the field of natural sciences in 2004–2005. The main subject matter of the laboratory relates to integrated projects of different chairs in the overlapping fields of biology, chemistry, geoecology and physics (e.g. study of plant metabolites, analysis of geological stages, *etc.*). The aim is to increase the proportion of researchers in the academic personnel to at least 20% by the year 2006. Systematic application of the rotation principle of lecturers and researchers would also contribute to the improvement of qualification of the academic staff.

6.4. Cooperation with the University Administration

The problems relating to teaching are discussed in reversed hierarchical order: chair (lectureship) – department – faculty – university. Proceeding from the level of management: head of the chair – head of the department – council of the department – dean – council of the faculty – vice-rectors – university council – expanded council of the university – rector.

There is mutual information exchange between the University management and the Department of Natural Sciences. In accordance with the Statutes of Tallinn Pedagogical University and other relevant documents, the cooperation takes place through the following main structures:

- 3 members of the Department of Natural Sciences (Professors H. Kukk, R. Mankin, J.-M. Punning) are members of the Council of TPU. The department is also represented in the Research and Development Commissions of Tallinn Pedagogical University: Prof. R. Mankin is the Chairman of the Research Commission, Prof. J.-M. Punning is the Chairman of the Development Commission. The Council can discuss only these problems which the commissions have proposed.
- Prof. H. Kukk represents the Department in the Government of the University. The Government carries out the decisions made by the Council of the University and deals with other current general problems.
- The Dean serves as a link between the Department and the University management. The Dean's office keeps account on study results; the Department of Academic Affairs uses this data to keep account on dismissed and admitted students. The department is responsible for the quality of teaching.

Since 1996, the faculties and academic departments are completely free to solve the problems falling within their competence. However, making their decisions they must naturally follow the documents regulating the university life (Statutes of the University, etc.).

The first signal about discords in teaching comes either from students or instructors propose to apply some changes. The shortcomings are reported at the meetings of the Chair which are held every week. Feedback takes place in the form of resolutions or written orders.

Cooperation with the University management is aimed at finding possibilities for integration with institutions of natural sciences and other universities to strengthen the scientific and material level.

To inform the public about scientific and teaching activities, developments, etc. in the University as a whole, in the Faculty of Mathematics and Natural Sciences, in the Department of Natural Sciences and in the Chairs, surveys are printed in the form of booklets or in newspapers; information is also available in the internet. For instance, the web-site of the Chair of Biology that coordinates the curricula of Biology was opened in 1999 (http://www.tpu.ee/~maku/bioloogia_oppetool.htm).

The personnel of the University can learn about the problems relating to the university life from the *Unilist* in the Internet. Heads of academic departments and their assistants are switched into the web-based interactive document management programme *Postipoiss*. **Thus, information is operative and available at all levels.**

7. Quality Assurance and International Relations

7.1. The System of Quality Assurance

Quality assurance of scholastic proficiency in Estonian universities is regulated by certain regulative documents (*the Law of Universities, Higher Education Standard, Estonian Government's regulation from October, 2003*).

Quality assurance for the curricula of Biology (Marine Biologist – Specialist on Environmental Subject) Bachelor's Degree and Biology Master's Degree is based on the *Statute of Curricula* and the *Regulations for the Organization of Studies*. Councils of curricula are formed in accordance with the resolution by the Estonian Government in October, 2003.

The following methods are used for quality assessment:

- analysis of curriculum
- analysis of study activities and organization of studies
- analysis of resources
- analysis of quantitative and qualitative data
- analysis of feedback from students
- analysis of academic achievement of students
- analysis of feedback from employers
- analysis of feedback from graduates.

There has been started a discussion on the level of academic departments to work out general principles for quality assurance, to formulate the extent of contribution and responsibility for every party involved in the studies and to describe the procedures that would assess the following of the agreement. The outcome is expressed in *The Fundamentals of Quality Management in Tallinn Pedagogical University*, the document scheduled for discussion and confirmation in the TPU Council during the spring semester in 2004. At the same time there is a university wide electronic evaluation system in development to assess teaching, subject courses, organization of studies and job market subsistency for alumni that will be tested for the first time in the autumn term this year.

These are the factors that are considered in order to ensure the quality of a curriculum: information about employment rate and career of graduates; the relations between employers and alumni and their contentment with the graduates' level of education; students' surveys in both oral and written form about the quality of teaching, courses, academic staff. Also a comparison of the levels of graduation, Bachelor's and Master's theses between different Estonian and European higher education institutions is constantly carried out as the above mentioned papers are reviewed mutually, participation in corresponding examining boards takes place, etc.

In 2001 and 2003 the academic personnel also took part in the training programs of *the Baltic Sea University*.

The quality assurance of the development of the curricula in the faculty (including the co-operation between alumni, employers and guilds) is good. There is constant communication between alumni and the representatives of the Ministry of Education

and Research taking place in the frameworks of Subject Teachers' Days and teacher trainings.

Quality assurance of studies (the methodology of studies, the organization of individual study and the improvement of learning material) also has a lot of room for development. The quality assurance in the TPU Faculty of Mathematics and Natural Sciences is still at the early stage of development, just like in other Estonian universities. In that field there are plans for constant development (e.g. the aforementioned co-operation with Glasgow University. In the past few years there have been improvements in the counselling system, in tutoring, in organizing methodical seminars for lecturers and feedback polls for students about their subjects in previous semesters.

The development plan of the Department for assuring the quality of studies and research is given in Appendix 7.

7.2. General Principles of Quality Assurance

The efficiency of studies and quality assurance are of very high priority in Tallinn Pedagogical University.

Initial signal about the inconsistencies in studies comes either from students, graduates, employers, boards of the curricula of biology or the proposals for changes are done by instructors. (see Chapter 2.2. *Elaboration and Development of Curricula*).

Questionnaires for students are carried out regularly at the end of each semester to get feedback on the quality of studies. The results are taken into consideration in compiling syllabi and analyzing teachers' work (see Chapter 7.3. *The Feedback of Students and Graduates on Their Studies*; Appendices 27, 28). Due to the peculiarities of studies and their own initiative, instructors have also conducted surveys during the studies.

Problems in study process are regularly discussed at meetings and seminars of the Department and the Chairs (for example the meetings of the Chair of Biology take place once a week).

The collection, analysis and systematization of the data about graduates are dealt with by the TPÜ Career and Counselling Centre. Beginning in autumn 2004, the alumni will have the opportunity to give feedback via Internet, the electronic feedback system will hopefully be finished by that time. So far the collected results indicate that the majority of graduates proceed to work in the fields connected with their speciality, or instead continue their studies.

Procedure for selecting teachers in TPU is based on a public contest, the main element of which is a habilitation committee, consisting of leading scientists and teachers in their speciality from outside of TPU. The elections for professors are held in TPU Council, other teachers are assigned to their positions by the Faculty Council. This system rules out the enrolment of teachers with a low professional level.

Amendments to the curricula are made once a year and approved by TPU Council in March.

All the curricula and annotations for subjects along with the information on the volume and form of studies and scholastic proficiency are published in the *TPU Reference Book of Studies*, for the 3+2 system the information is also available on the homepage of TPU (www.tpu.ee/tasemekoolitus.html).

7.3. The Feedback of Students and Graduates on Their Studies

To obtain feedback from students, the Department of Natural Sciences conducts a survey *Feedback on the Studies* at the end of each term. 2003/04 autumn semester gave 184 responses. Altogether 697 assessments for different subjects, 34 for teachers and 52 for subject courses. Students evaluated different aspects of studies in the 5-point scale („1“ being lowest and „5“ highest) (See Appendix 28 for the questionnaire; Tables 7.3.1 and 7.3.2 for the results of the survey).

Table 7.3.1.

The results for the student survey *Feedback on the Studies* conducted by the Department of Natural Sciences of Tallinn Pedagogical University (TPU). Average assessments given by questions.

The syllabus was available.	4,17
The lecturer followed the given syllabus.	4,37
Lectures/seminars started and ended at a specified time.	4,34
The criteria to sit an examination/assessment were known.	4,57
The composition of the lecture/seminar was logical and well structured.	4,12
The lecturer presented the subject in a clear and understandable way.	4,09
The lecturer used relevant materials, up-to-date research results and examples.	4,27
Sufficient illustrative materials for the given subject were used.	4,13
The required literature and additional resources given in the syllabus were available.	3,97
Students were given a chance to actively participate in the lecture/seminar.	4,03
Students were treated fairly and objectively.	4,52
Opportunities to get in contact with the lecturer were good.	4,37
Considering that 1 ECTS = 40 hours of the student's work, the workload for the given subject met the volume of credit points received.	4,35
The subject was essential from the viewpoint of my area of specialisation.	4,57
The percentage of actual studies that took place.	96,23
The percentage of a student's participation in lectures/seminars.	87,85

Table 7.3.2.

The results of the student survey *Feedback on the Studies* conducted by the Department of Natural Sciences of Tallinn Pedagogical University (TPU). Average assessments are given by questions.

The average for questions 1-14.	4,27
Following of the Regulations of the Organization of Studies (the average for questions 1, 2, 3, 4, 9, 13).	4,29
Methodical competence of lecturers (the average for questions 5, 6, 7, 8, 10, 11).	4,19

As it appears, the values for all questions are near the total average – 4.27. The highest values (4.57) came from the questions about the subject's relevancy for the given area of specialisation and the announcement of the examination/assessment requirements. The lowest result (3.97) came from the availability of the required study literature and additional material. Comments were added about 17 subjects, pointing out shortcomings in teachers' work (10 comments), the main complaints being about the multitude of study materials required, the necessity to take excessive notes and difficulties in understanding the subject. Occurrences of positive emotions were fewer (4), approving interesting lectures and teachers with an excellent command of their subject. The rest of the comments (7) were about suggestions for changing the studies, for example reducing the content of some subjects, making study materials accessible over the Internet, having more interesting experiments and a variety of teaching methods.

According to the results of the survey we can conclude that:

- the academic work of teachers and the Chair is highly appreciated;
- more attention needs to be paid to the availability of required study literature and additional materials, and notifying students about the corresponding information. The analysis showed that difficulties of obtaining the required materials appeared primarily among the students who were often absent.

The refining of the curricula in BSc studies is carried out gradually due to the fact that none of the students of the Department of Natural Sciences have finished their Bachelor's studies in Biology yet. In the future, a considerable amount of information for the modification of the curricula will come from BSc graduates and their employers. Another important source for determining the substantial alterations in the curricula is biology itself, the observation of the general evolution of its branches, pedagogics and didactics of natural sciences in a global scale, giving us the opportunity to be proactive (the strategy has proven to be a forte in developing a curriculum).

The students at the Bachelor's level have shown medium progress (Appendix 23), but the rate of dropping out (7 students within 3 years) is still tolerable considering the intensity of studies.

The feedback of Master's degree graduates is of great importance for principal changes in the curricula of BSc studies. The majority of matriculants for the Master's studies are therefore graduates of the 4- or 5-year Diploma studies of the teachers of natural sciences in TPU (6141058 and 5141005), but also graduates of

Diploma studies from the Estonian Agricultural University, University of Tartu and Estonian Maritime Academy. Because of the peculiarity of the curriculum, most of the students of Master's and doctorate studies are employees of many different divisions of the Estonian Marine Institute of University of Tartu.

The overview of the graduates of Master's studies in Biology in 2000-2003 is shown in Table 5.7.1 and in Appendix 24.

The employment rate of MSc graduates in Biology is monitored every year.

The records about MSc graduates: in 1997, 5 out of 6 graduates proceeded to work on their speciality in the Estonian Marine Institute of University of Tartu and continued their education in doctoral studies either in the University of Tartu, Tallinn Pedagogical University or in the Estonian Agricultural University. In 1998, two graduates went to work for the Estonian Marine Institute, at the same time continuing at Doctor's level in TPU and one was employed in the TPU Institute of Ecology (and continued Doctor's studies in the University of Tartu). In 1999, one graduate who we have data on, also proceeded to work on his specialty, also continuing Doctor's studies in TPU. All 3 graduates of 2000 that we know about, went to work on their speciality – two of them in the Estonian Marine Institute (continuing doctoral studies in TPU) and one in the Department of Students of University of Tartu. In 2001, two got employed in their profession (Saku Control Center of Plant Production and Estonian Meteorological and Hydrological Institute), one continued his doctoral studies in the University of Kiel. Graduates of 2002 - all five that we know of, work on their profession (Tõstamaa Secondary School, Estonian Radiation Protection Centre, Hiiumaa Islets Landscape Reserve, Tallinn Transport and Environment Department), two of them continued their doctoral studies in Tallinn University of Technology, and TPU. In 2003 – the only graduate we have knowledge about, proceeded to work on his speciality in the Estonian Meteorological and Hydrological Institute (see Appendix 24).

In the Department of Natural Sciences there are close contacts with the alumni of all curricula. Lecturers and alumni get together in the Estonian Teachers' Union, at in-service trainings, conventions of the Biology Teachers' Union and Association of School Physics, in chemistry teachers' club of the Estonian Chemistry Society, etc.

Surveys for alumni are carried out periodically by the Career and Counselling Centre of TPU, the results being differentiated by departments, including the Department of Natural Sciences. For example, in 2003 a questionnaire was conducted to find out about the assessment of graduates on specialized studies and for suggestions to make the curricula more attractive (see Appendix 27). As a result, it turned out that the alumni are satisfied with the quality of studies and can successfully put their acquired knowledge to practice, both in their speciality and in other lines of work.

There were also pointed out some shortages, for example:

- insufficient professional language practice
- little training for expressiveness in the native language to manage as a teacher.

Those deficiencies are constantly corrected in the process of studies when possible. The two new science laboratories opened in September 2000, along with the modernization of the old ones, surely give more potential for practical laboratory

work. According to the development plan of the Department, further elimination of those mentioned shortcomings is planned (see Appendix 7).

As a result of the regular surveys we can say that both students and teachers value primarily the qualification of teachers and the level of teaching, showing us that the lecturers in this specific field are professionals and the attitude is passed on to the students. The knowledge obtained is also estimated high by graduates which makes it possible to be successful in the labour market.

7.4. Changes in the Curriculum Development Compared to the Previous Accreditation

At the previous evaluation of Tallinn Pedagogical University (TPU) curricula of Master's studies in Biology (including the curriculum of Master's degree in Biology (Ecology), analyzed in the present report) (7420201) in 1998 the main complaints of the commission of experts and the Estonian Higher Education Assessment Council were about the modernization of laboratories and their equipment, also about the lack of sufficient academic and educational literature. It was also pointed out that the organization of studies was based mainly on the staff of only one Chair and therefore it was considered necessary to increase the number of personnel with various specialities. The resolutions and opinions of the Estonian Higher Education Assessment Council are shown in Table 7.4.1.

Table 7.4.1

The recommendations of the expert commission (in 1998) and their implementation

EXPERTS: Elmars Grens; Per Rosenkilde; Aija Sadurskis; Jozef Toldi	
COMMENTS:	WHAT HAS BEEN DONE:
Curriculum	
Too many subjects with insufficient volume.	The amount of subjects with low credit points has been remarkably reduced. While in 1998 there was 1.4 credits per subject on average then in 2004 these figures are 2.6 for Bachelor's studies and 5.7 for MSc.
Insufficient discussion of molecular and cellular processes of modern biology, especially in practice.	Volume of the subjects for molecular and cellular biology has grown (~3 ECTS) and the subject is now also covered in other courses (Plant and Animal Physiology, Developmental Biology). New laboratories were built for corresponding practical work – P-210 and 211. P-406 was modernized and the situation will improve even more in the near future with the completion of the new building in 2005 (see Appendices 7, 19).

Study process	
Mostly oral examinations are used, making it hard to verify the scale of assessment.	Now mostly written or combined examinations are used in Bachelor's studies. In Master's studies where required literature depends on the branch of the studies or research topic, mainly oral examinations are still used.
The absence of agreements between the concerned parties in the studies about obligations and responsibilities.	Work on the contractual basis is more specified, co-operation has extended, joint researches and aspects of collaboration and also the possibilities to use study materials from other institutions have accrued. Contracts are signed with TPU Institute of Ecology, Estonian Marine Institute of University of Tartu, Institute of Chemistry of Tallinn University of Technology, Institute of Experimental Biology of Estonian Agricultural University, Tallinn Botanical Gardens, Tallinn Zoological Gardens, Estonian Museum of Natural History, University of Turku and Uppsala University).
Academic staff	
Lecturers are experienced but somewhat distanced from modern biology.	Half of the lecturers (<i>Cand. Sci.</i> Toomas Veidebaum, <i>PhD</i> Ats Metsis, <i>PhD</i> Margus Harak) actively practise in subjects of modern biology (see Appendix 8).
Too many subjects are taught descriptively.	Laboratories and ICT systems have improved, the importance of individual work, seminars and workshops has increased, in many subjects practical trainings are organized in environmental protection organizations, urban (subjects in the Baltic University Programme, Man and Environment programme, etc.) and natural environments are explored during four fieldworks (see Chapter 3.5).
Low academic activity.	Many lecturers have received an MSc or PhD (<i>MSc</i> Tõnu Ploompuu, <i>PhD</i> Edgar Karofeld, <i>PhD</i> Margus Harak). Lecturers with a degree have been employed (<i>MSc</i> Arno Põllumäe) instead of the ones without. The amount of researches done and published in degree studies has increased.

The need to increase the number of lecturers with different specialities.	The amount of lecturers with various specialisation (Ats Metsis, Tiit Raid, Arno Põllumäe) has grown and in the next few years (due to the foundation of Tallinn University) the staff will grow even more (Appendix 7).
Study environment	
Inadequate equipment in laboratories.	The condition of laboratories has improved (see <i>Chapter 4.1. Infrastructure</i>). New laboratories have been built and equipped – P-210 and 211. There have been built and equipped two new laboratories: one for molecular and cellular biology, the other for organic and biochemistry research both with modern equipment. The existing laboratories have also been reformed, the rooms have been repaired and modernized (chemistry lab), some new equipment installed in physics labs.
Insufficient amount of special literature and textbooks in the library.	A great number of academic and educational literature has been obtained, largely due to one of Estonia's largest libraries of natural sciences – Estonian Academic Library - merging into the structures of TPU. Availability of electronic databases and scientific journals has increased. In conjunction with the union of the Academic Library, availability of literature for studies and research is rated best in Estonia (see <i>Chapter 4.2. Library, Study Aids.</i>) Modern textbooks are provided for all students in many subjects (<i>Baltic University Programme, Man and Environment, etc.</i>).
Quality assurance	
Random feedback from students.	Regular analysis of student feedback on the organization of studies by subjects is carried out, both university-wide by the Chairs at the end of the course) and by teachers during the studies. Information about the career of graduates is also systematically analyzed (see <i>Chapter 7. Quality Assurance and International Relations</i>).

Summary

A short description of the problems as well as strong sides related to the Biology curricula at the Tallinn Pedagogical University are listed in the table below:

Advantages	Problems
A - national level	
The curricula are unique in Estonia; Curricula are competence based; In the implementation specialists from other institutions are involved.	The universities and science on the whole in Estonia do not get enough support from the state to develop their infrastructure; the number of state-financed study places does not correspond to the need.
B - university level	
Curriculum development proceeds in concordance with the objectives of the University; the University gives support for running the Biology curricula.	There are some minor problems with the coordination of the studies with other departments (mainly related to accommodating general courses to the needs of our curricula).
C - department level	
There are fairly good conditions for implementing the curricula; high professional level of the teaching staff.	Because of the relatively low salary level and high overload at the university it is difficult to employ motivated descendants.
D - student level	
Student-centered possibilities to adapt the curricula to personal needs and interests; relatively small study groups; excellent student-teacher personal relations.	Lack of the scholarship to support studies, which is the reason why many students have to have jobs in parallel with studies.

The main emphasis in the activities of the Department of Natural Sciences during the past few years has been the curriculum development. The priorities for the coming years are: first of all, initiation of and participation in both Estonian and European research programmes, but also continuous support to young faculty members pursuing their academic degrees. The next *PhD* thesis will be defended during the year 2004 (T. Drews, T. Paalme).

Appendices
