

Doctoral Study Programme

WOOD MATERIALS AND TECHNOLOGY

General information about the study programme

Classification Code of the Republic of Latvia – 51543 Nominal length of full time studies: 3 years Qualification: Doctoral degree Doctor of Science (Ph.D.) in Engineering Science and Technology Accredited till December 15, 2028 Director of programme: Āris Jansons , Associate Professor, Dr.silv. Study programme of Forest Faculty Address: Akademijas Street 11, Jelgava, LV-3001 Contact information: email: aris.jansons@silava.lv, phone: +371 63021619
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Annotation

The content of study programme which is in force at present has been upgraded and supplemented taking into consideration suggestion by the Accreditation Commission (June, 2010) and the approved standard of doctoral studies LUA (LUA Senate decision Nr.6- 259, February 10, 2010.) and is organized in compliance with the Law on Latvian High Schools and other normative documents which is in force in the Republic of Latvia and regulation documents signed by the Senate of LUA.

Degree obtained is a doctor of engineering (Dr.sc.ing) in Material Science

Goal of the Doctoral programme is to prepare highly qualified scientists for sub- sector of Material sciences - *Wood materials and technology*, thus stimulating development of the engineering industry of wood materials and technologies, and to prepare high-quality new generation of scientists of international level, as well as creating preconditions for change of generations of scientists in the industry and also members of academic staff.

The **mission** of Doctoral studies is to ensure achievement of the goal of Doctoral studies, thus stimulating change of generations of scientists in the industry of Material sciences and rejuvenation of the composition of LBTU Forest faculty's academic staff.

Doctoral studies must ensure that new scientists:

- Demonstrate the ability to set, formulate, manage and independently research topical and significant problems in the sub-sector of the industry;
- Are creative and proficient in general and specific cognitive methodology;
- Are able to adapt in implementation of national and international level research projects;
- Gain comprehensive knowledge in the chosen industry and the related sub-sectors;
- Acquire teaching skills and experience needed for junior academic staff in the university and for introduction of scientific society with results of their research in national and international audience;
- Are able to elaborate and submit for defence their Doctoral thesis, for acquisition of scientific degree.

Learning outcomes

Knowledge: deeper know and understand theoretical and empirical research methodology, scientific language/terminology of Wood Science; systemically understanding of problems and theories in the field of Wood Material Science research; understand importance of: theoretical and practical innovations/novelty in the field of Material Sciences – Wood Materials and Technology.

Skills – able to do theoretical and empirical investigations in Wood Science in cooperation with other persons involved in the investigation and studies; able to assess and choose independently appropriate research methodology; able to improve scientific competence in the frame of projects, participating and presenting results/reporting in scientific conferences, discussing in seminars, symposiums and work groups; able to develop/create new knowledge and understanding on existing knowledge and their practical usage implementing important and genuine investigation results, part of which is on the level of internationally indexed publications and gaining success appropriate to the international level of the field; able to assess responsibly the field of investigation and its results in the context of interdisciplinary research and sustainable development; able to supervise research or developmental tasks of Wood Science at work, communicate on the field of investigation with scientists and society in general.

Competence: able to put forward innovative research ideas independently, analyse, synthesize and assess them critically in the field of Wood Material and Technology Science and interdisciplinary research context; able to carry out important scientific investigations and implement innovations responsibly, independently and critically, able to publish investigation results in Latvia and abroad in internationally recognised issues, i.e. indexed issues; able to plan, structure and manage scientific projects, i.e. international ones responsibly and independently; able to supervise scientific theses, lead a team or be a team member, communicate with colleagues, scientists and society in the appropriate expert field; able to promote the development of Material Sciences: sub-branch of Wood Materials and Technology, social progress in the knowledge society emphasizing its sustainability opportunities.

The name of the study programme – **Wood Materials and Technology** - conforms to the Classification of scientific disciplines (**Material Sciences**) and sub-sectors (in the sub-sector *Wood materials and technology* of the industry of material sciences), composed by the Latvian Council of Science.

Directions of Doctoral studies in speciality of material science *Wood materials and technologies* of Forest faculty are as follows:

- **Material science of wood-pulp;**
- **Technologies of wood-pulp treatment and processing;**
- **Marketing and logistics of wood-pulp and wooden products.**

The didactic and organizational concept of study programme is developed, based on the laws and regulations of the Republic of Latvia: *Law on scientific activity*, *Law on higher education establishments*, regulations No. 1001 of 27.12.2005 *On the process and criteria of Doctorate*, issued by the Cabinet and LBTU Senate's resolutions: No. 6-259 of 10.02.2010 *Regulations on LBTU Doctoral studies* and No. 6-260 of 10.02.2010 *Regulations on the tender procedure of state budget funded seats for Doctoral studies at LBTU*.

Study programme **Wood Materials and Technology** is an academic Doctoral programme. Practice is related to collection of empiric material and takes place in LBTU Forest faculty, Forest and Wood Products Research and Development Institute, Latvian State Institute of Wood Chemistry, Latvian State Forest Research Institute *Silava* and production enterprises, as well as in universities abroad. Doctoral studies are performed in accordance with the individual work plan which, within two months of admission in Doctoral studies, is drafted by Doctoral student together with supervisor of his/her Doctoral thesis and submitted in the department, specified by the director of Doctoral programme. Study plan, accepted by the director of department and director of Doctoral programme, has to be submitted in the Council of Forest faculty for approval. Doctoral student submits the approved work plan in Doctoral unit of LBTU. Doctoral students' workresults are discussed in the academic meeting of the department twice a year.

After completion of theoretical studies and elaboration and defence of Doctoral thesis, Doctoral graduates get the highest scientific qualification – **engineering Doctor's** (Dr.sc.ing.) degree (resolution of Latvian Academy of Sciences No. 1-1 of 17.02.1998).

Length of studies

Full time: 3 years = 48 weeks x 3 = 144 weeks.

Doctoral students have rights to use two academic leaves (2 x 12 months) as well as cancel studies because of plausible reasons and to renew their studies again

Total range – 120 CP (180 ECTS):

Doctoral thesis – 100 CP (150 ECTS),

Theoretical studies – 20 CP (30 ECTS).

Parts	CP (ECTS)	Demands
<u>Theoretical studies</u>	20 (30)	
<u>Doctoral thesis</u>	100 (150)	
• Research and elaboration and Layout of Doctoral thesis.	75 (112.5)	Defence of thesis in the Promotion Council of Forest Sciences and Material Sciences (sub-branch: Wood Materials un Technology) of LUA
• Preparation of scientific articles and publishing of research results.	15 (22.5)	Publications on a study results in peer reviewed issues recognised by the Latvian Council of Sciences, <i>including</i> the study course <i>Preparing of Scientific papers</i> - 3 CP (4.5 ECTS).
• Presentation of the research results in International Scientific Conferences.	10 (15)	Reports in International scientific conferences/congresses/seminars.
Totally:	120 (180)	

Theoretical studies of Wood Materials and Technology

The study subjects	Test	CP (ECTS)	1 st year		2 nd year		3 rd year	
			1 sem.	2 sem.	3 sem.	4 sem.	5 sem.	6 sem.
1.Compulsory part		20 (30)						
1.1. Scientific research methodology	Examination	4 (6)	4 (6)					
1.2. English (German) For Academic purposes	Promotion Examination	4 (6)		4 (6)				
1.3. General theoretical course of the sub-branch “Wood Materials and Technology”	Promotion Examination	6 (9)				6 (9)		
1.4. Special theoretical course of Research Directions	Promotion Examination	6 (9)						6 (9)

**Implementation plan of the doctoral study programme
“Wood Materials and Technology” for full-time studies**

Study year 1.

Theoretical studies - 8 CP (12 ECTS)		
English (German) for Academic Purposes	4 CP (6 ECTS)	Promotion Examination
Scientific research methodology	4 CP (6 ECTS)	Examination
Elaboration of the descriptive part of promotion work , publication and approbation – 32 CP (48 ECTS)		
<p>1. Preparation of methodological basis for the theoretical research (included study course “Preparation of scientific papers”).</p> <p>2. Preparation of methodological and material basis for the experimental research.</p>	<p align="center">23 ... 27 CP (34.5 ... 40.5 ECTS)</p> <p>Included study course “Preparation of scientific papers”: 3 CP (4.5 ECTS), voluntary study course.</p>	Developing of the methodological part of planned research
3. Preparation of a report and its presentation at the scientific and practical conferences.	<p align="center">2 ... 4 CP (3 ... 6 ECTS)</p> <p>Latvia – 2 CP (3 ECTS) Abroad - 3 CP (4.5 ECTS)</p>	Copy of conference program
4. Preparation publications and presentation of the obtained research data.	<p align="center">3 ... 5 CP (4.5 ... 7.5 ECTS)</p> <p>Latvia - 2 ... 4 CP (3 ...6 ECTS) Proceedings of LUA – 4 ... 5 CP (6 -7.5 ECTS) Abroad - 4 ... 6 CP (6 ... 9 ECTS)</p>	Copy of publication

Study year 2.

Theoretical studies - 6 CP (9 ECTS)		
General theoretical course of the sub-branch “Wood Materials and Technology”	6 CP (9 ECTS)	Promotion Examination according accepted program by Promotion Council
Elaboration of the descriptive part of promotion work, publication and approbation – 34 CP(51 ECTS)		
1. Elaboration of the descriptive part of promotion work	<p style="text-align: center;">23 ... 27 CP (33 ... 39 ECTS)</p> <p>Included study course “Multivariate Data Analyses”: 4 CP (6 ECTS), voluntary study course.</p>	<p>Definition of the aim, tasks and hypothesis of the research.</p> <p>Analyses of literature.</p> <p>Completion of the methodological part of the promotion work.</p> <p>Experimental work.</p>
2. Preparation of a report and its presentation at the scientific and practical conferences	<p style="text-align: center;">2 ... 4 CP (3 ... 6 ECTS)</p> <p>Latvia – 2 CP (3 ECTS) Abroad - 3 CP(4.5 ECTS)</p>	Copy of conference program
3. Preparation of a publication and presentation of the obtained research data	<p style="text-align: center;">5 ...7 CP (7.5 ... 10. ECTS)</p> <p>Latvia - 2 ... 4 CP (3 ...6 ECTS) Proceedings of LUA – 4 ... 5 CP (6 ...7.5 ECTS) Abroad - 4 ... 6 CP (6 ... 9 ECTS)</p>	Copy of publication

Study year 3.

Theoretical studies - 6 CP (9 ECTS)		
Special theoretical course of Research Directions	6 CP (9 ECTS)	Completion of the theoretical and experimental part of the promotion work. 2 reviewers: <ul style="list-style-type: none">• A member of the Promotion Council;• Representative from Department where promotion work is worked out.
Elaboration of the descriptive part of promotion work , publication and approbation – 34 CP(51 ECTS)		
1. Elaboration of the descriptive part of promotion work	14 ... 18 CP (21...27 ECTS)	
2. Preparation of a report and its presentation at the scientific and practical conferences	2 ... 4 CP (3 ... 6 ECTS) Latvia – 2 CP (3 ECTS) Abroad - 3 CP (4.5 ECTS)	Copy of conference program
3. Preparation of a publication and presentation of the obtained research data	4 ... 6 CP (6 ... 9 ECTS) Latvia - 2 ... 4 CP (3 ...6 ECTS) Proceedings of LUA – 4 ... 5 CP (6 ...7.5 ECTS) Abroad - 4 ... 6 CP (6 ... 9 ECTS)	Copy of publication
4. Drawing up of the promotion work and its summary	10 CP (15 ECTS)	

**Annotations of the theoretical study courses
of the doctoral study program
“Wood Materials and Technology”**

1. Scientific research methodology. 4 CP (6 ECTS). Examination.
Professor, Dr.sc.ing. I. Arhipova, professor, Dr.agr. L.Paura.

Annotation

Deductive and inductive cognition. Structuring of the doctoral thesis. Most frequent error analysis. The collection, processing, analysis and interpretation of results, approaches and methods mathematical. The problem of the representativity. Statistical sets, the distributions and characteristics. Formulating and testing hypotheses. Specificity of processing methods, their relevance for research task and the empirical material, choosing the most appropriate methods. Partial development of the thesis.

Learning outcomes

The course of study for doctoral students acquire **knowledge** of the implementation of the common regularities of scientific research, starting with the determination of the basic conditions of the study (subject, purpose, a working hypothesis, research objectives), formulation of thesis content outline, information collection, computer processing and interpretation of results and ending with the thesis writing and defence conditions. Doctoral students develop **skills** to independently choose the conditions for rational implementation of the thesis, including the choice of the most appropriate mathematical methods and its application for the meaningful interpretation and presentation of the results. Following the course of learning doctoral students are **competent** to independently perform scientific work, also choose, develop and defend a dissertation.

2. English (German) for Academic Purposes (a core course for doctoral students). 4 CP (6 ECTS). Promotion exam.

visiting assistant professor, Dr.paed.
D.Grasmane. assistant professor T.Šinkus,
(lecturer, Mg.phil. Oksana Mališeva).

Annotation

The study course includes a systematic coverage of the knowledge and skills needed to succeed in research work. It includes focus on improving scientific writing skills, presentation and oral skills (discussion and fluency building), research vocabulary building, and search and selection of relevant information, using authentic research literature. Teaching and independent studies are combined. Diverse methods are used in the teaching-and-learning process: Role play, debate, discussion, textual and vocabulary

work. Doctoral students will become familiarized with the European Research Area and will acquire the formal styles used in journal publications and conference contributions. Different forms of writing, including literature reviews, research proposals, conference submissions and formal letters, are covered. The key principles of communication in the classroom, authenticity in terms of tasks and texts, learner autonomy, and critical thinking and analysis underpin all the activities. Information communication technologies (ICT) are widely used in the classes. The course includes practical classes, seminars and workshops, and ends with a final examination.

Learning outcomes

Knowledge: Doctoral students will become aware of and understand the role of the ERA. They will recognize and understand the formal styles used in research publications and conference contributions in the English (German) language. They will become familiarized with how to prepare a successful research proposal, a Power Point presentation, a poster, and a review of research literature, and how to write formal letters to journal editors, foreign researchers, and conference organizers.

Skills: Doctoral students will be able to investigate, evaluate and use creatively authentic research literature in English (German) for their own research needs; they will be able to discuss, provide argumentation and find solutions to research problems in their fields of interest. They will be able to develop their own research proposals and use the formal writing style in their own contributions, submissions and correspondence.

Competence: Doctoral students will be able to function confidently in an English (German)-speaking academic and professional environment. They will be able to plan, organize and conduct their professional and research activities in the English (German) language to achieve their set goals.

3. Preparation of Scientific Papers (voluntary course for Doctoral students). 3 CP (4.5 ECTS). Test.

Professor, Dr.agr. Z.Gaile.

Annotation

Necessity to publish scientific papers, their diverse levels and citation are analysed in the study course. Structure of scientific paper and meaning of separate sections are acquired: Introduction, Materials and Methods, Results, Discussion, Conclusions, Abstract, and List of references. Effective tables and figures. Appropriate units of measurements. Scientific literature, references in text and preparation of References' List. Various demands set by different scientific journals. Reviewing. Preconditions for preparation of successful posters and oral reports.

Learning outcomes

Doctoral students acquire **knowledge** in importance of scientific papers' publishing and inclusion into international data bases; SCI. They acquire IMRAD structure of scientific paper and diverse demands of various journals for preparation of scientific paper. Knowledge for successful preparation of posters and oral reports are given.

Skills. Doctoral students are able to write separate sections of scientific paper in accordance to set conditions, and to include into section appropriate to title content. They are able to prepare effective tables and figures. Students know how to use scientific literature, to make references into text and to prepare list of references.

As a result, doctoral students are **competent** to prepare scientific papers according to concrete set up regulations, as well as to prepare report for conference. They are competent to lead section work in scientific conference.

4. Multivariate Data Analysis (voluntary course for Doctoral students).

4 CP (6 ECTS). Test.

Professor, Dr.sc.ing. I.Arhipova, professor, Dr.agr. L.Paura.

Annotation

PhD student acquire multivariate data analyses methods, as also check the model assumptions violations. The study course is oriented to multivariate methods choice acquisition and methods comparison. During the studies the real examples related to biology, agriculture and other sciences are used. Statistical software is provided for problem tasks solving. The course topics are the following: parametric and non-parametric two sample statistical methods, analyse of variance (ANOVA), analyse of covariance (ANCOVA), principal component analyse (PCA), factor analyse, cluster analyse, two group discriminate analyse, multivariate analyse of variance (MANOVA).

Learning outcomes

After completing the study course doctoral students will have:

- **Knowledge** - about multivariate data analysis methods for emerging scientific theories and its application for PhD research on professional fields;
- **Skills** - individually evaluate and select multivariate data analysis methods for scientific researches of important, original and internationally cited researches;
- **Competences** - in collaboration with PhD supervisor individually perform critical evaluation of data analysis methods. Solve important scientific or innovative tasks and individually propose research ideas.

5. General theoretical course of the sub-branch “Wood Materials and Technology”. 6 CP (9 ECTS). Promotion examination.

Annotation

The study course offers discussions and provides the extended knowledge of the fundamental problems of wooden materials and technologies: studies of wooden materials, complex and perspective evaluation of wooden materials quality. Improvement of natural and exploitation properties of wood. Use of wooden materials in structures.

Problems of complex utilization of wood and wooden materials. Technologies of mechanical and chemical processing of wooden materials.

Learning outcomes

Doctoral students will get an extended **knowledge** of the latest findings about wooden materials and technologies, methods of studies, information processes and use of results of research, as well obtain skills for its practical realization. Doctoral students obtain **skills** to discuss about up-to-date problems of wood and wooden materials and principles of choice the research methods. As result doctoral students will be **competent** to work independently in sphere of research of wooden materials and technologies, as well to prepare professional and scientific publications and independently develop a doctoral thesis in accordance with current requirements.

6. Special theoretical course of Research Directions. 6 CP (9 ECTS). Promotion examination.

Annotation

The study course offers for Doctoral students the extended knowledge to develop the planning, structuring and presentation skills. In result of analyze of research topics in selected area of studies, the aim of the doctoral thesis, research tasks and hypothesis of studies will be formulated. As a result first version of promotion paper will be completed, including the preface, analysis of situation, part of theoretical studies, main results of research, carried out in accordance to methodology of studies, potential conclusions, scientific novelty and practical significance of research.

Learning outcomes

Doctoral students will get an extended **knowledge** of the latest findings about wooden materials and technologies, methods of studies, information processes and use of results of research. Doctoral students obtain **skills** to carry out the research, to summarize, analyze and use the acquired knowledge in sphere of wooden materials and technologies, as well to prepare publications for national and international level scientific journals. As result doctoral students will be **competent** to work in sphere of research of wooden materials and technologies, as well independently develop and present doctoral thesis for public defenses, in accordance with current requirements. The graduates of the study programme will be able to participate in developing and supervising of national and international level scientific projects, as well to join to academic personal of universities to carry out the study programmes.

Accomplishment of the doctoral study programme

The regulations and requirements formulated in the program are mandatory for the doctoral students of Latvia University of Agriculture, specialized in sub-sector of Material sciences “Wood Materials and Technology”, their scientific supervisors and academic personnel who take part in the program accomplishment.

The study content is formed by the following main positions:

- ✓ Theoretical obligatory studies;
- ✓ Accomplishment of scientific research work;
- ✓ Presentation of the research results;
- ✓ Preparation and designing of the promotion work.

Individual approach and feedback in Doctoral studies is implemented in several ways: discussion of study process and content, participation in scientific work, participation in pedagogic work.

Discussion of study process and content. The process of Doctoral studies and changes in the content of studies are discussed in the sessions of Forest faculty Council and respective departments which review and evaluate execution of the individual plans of Doctoral students. Opinion of Doctoral students is heard out and evaluated also by the director of Doctoral studies, supervisors of their theses and teachers of study courses, within the limits of their competence. The major changes are introduced in the content of special course in respective sub-sector of material sciences industry and in the content of special course in research direction. Both of these courses together add up to 12 CP.

Participation in research work. All Doctoral students are involved in research projects which are implemented in respective departments, *Forest and Wood Products Research and Development Institute, Latvian State Institute of Wood Chemistry* or *Latvian State Forest Research Institute Silava*. Thus, parallel to knowledge obtained in international courses and seminars, dealing with methodical problems is ensured, which responds in Doctoral students' suggestions on improvement of content and process of the study programme.

Participation in pedagogic work. Obtaining skills of pedagogic work is not a compulsory part of Doctoral studies, however a part of Doctoral students get the skills in addition, by supervising elaboration of Bachelor's thesis or diploma work of full-time or part-time students of Forest faculty.

The composition, structure and distribution of theoretical subjects of doctoral studies result from the formulated study objectives and tasks. Theoretical studies are completed with examinations Examination questions are formulated in compliance with the elaborated program. Every year of studies the doctoral student must present at least once his/her report at an international scientific conference or seminar. During the course of studies the doctoral student must provide the needed number of publications for promotion. The doctoral studies are concluded with writing and defending the promotion work.

Study potential of LBTU ensures mastering of theoretical course of Doctoral studies, elaboration of Doctoral thesis and active implementation of scientific activities of Doctoral students. Both traditional and modern methods are used in Doctoral studies – lectures by local and guest-lecturers, seminars, organized by forest industry (State Forest Service, JSC “Latvian State Forests”), are planned within the study courses in the places of production. The sequence of the study programme acquisition is determined by the work plan of the study programme, schedule for the current study year (centralised theoretical courses) and the doctoral student’s year work plan. The doctoral student together with his/her scientific supervisor works out a study plan for each year where theoretical subjects to be studied and research programme are given (literature studies, places of performing experiments) as well as the envisaged participation at the conferences, seminars and publications. The work plan is approved by the scientific supervisor and it is reviewed at the department meeting in the presence of a member of the promotion board, and then it is submitted to the Department of Doctoral Studies.

LBTU Fundamental library and computer rooms with computers of the departments of Forest faculty are freely accessible and free of cost to each LBTU Doctoral student. Doctoral students have an opportunity to use international catalogues via electronic media, and access to internationally quotable data bases is available to Doctoral students also beyond the premises of LBTU. The unified data network ensures access to information on the internet and through inter-library subscription. Doctoral students have access to internationally quotable journal articles on the subjects of interest. Exhaustive scientific information is available also in Forest and Wood Products Research and Development Institute, Latvian State Forest Research Institute *Silava*, Latvian State Institute of Wood Chemistry and in production structures of forestry sub-sectors. A part of Doctoral students continue studies of research methodology aspects in international Doctoral courses, organized by NOVA/BOVA.

Research work of Doctoral students is closely related to the subjects of their Doctoral theses, and thus also to the goals of the whole study programme. Themes of theses, chosen by Doctoral students, are topical, related to forest industry, live problems of woodworking production and research programmes. They are closely related to research direction of their scientific supervisors. Thus, well-qualified guidance is provided to Doctoral students. Doctoral students of programme *Wood materials and technology* perform research part of their thesis in laboratories of Department of Wood processing of LUA and Forest and Wood Products Research and Development Institute, as well as in various enterprises that possess the required laboratory basis, excluding Doctoral students whose research work is related to wood chemistry problems. Wood processing department of LUA has established good professional contacts with Latvian State Institute of Wood Chemistry, and several doctoral students of the programme "Wood materials and technology" from the Forest Faculty of the Latvia University of Agriculture are working on their promotion thesis on various specific problems of wood science in the laboratories of Latvian State Institute of Wood Chemistry under guidance of specialist of this institute.

Doctoral students who study in Doctoral program *Wood materials and technology* participate in activities of Nordic countries and Baltic States within the programme “Wood material science & engineering” (WSE). Since 2011 the new members Northern Great Britain and Northern Germany were joining the network and new name of network is now “Northern European Network for Wood Science and Engineering” (WSE). Mobility of students is ensured within a cooperation programme of Nordic countries and Baltic States „Wood material science & engineering” (WSE):

- Annual conferences of Doctoral students which take place in research centres of Nordic countries and Baltic states (2005 – in Honne, Norway; 2006 – in Stockholm, Sweden; 2007 – in Helsinki, Finland; 2008 – in Riga, Latvia; 2009 – in Copenhagen, Denmark; 2010 – in Tallinn, Estonia;; 2011 – in Oslo Norway; 2012 – in Kaunas, Lithuania; in 2013 – in Hannover, Germany). Proceedings of WSE meetings are published annually;
- International scientific courses for Doctoral students on topical problems of wood-pulp science and wood processing technologies, organized by Nordic countries and Baltic states;
- Individual consultations of students with leading professors of from HEEs of Nordic countries and Central European countries.

Doctoral students present their research results in international, national and university-level scientific conferences, as well as in seminars, organized by forest industry. As a particularly promoting arrangement of Doctoral studies, the annual international conference *Research for Rural Development*, organized by LUA, should be mentioned, where each Doctoral student, along with his/her scientific supervisor – co-author, tries to participate at least once, or even more times. Materials of the conference are recognized by Latvian Academy of Sciences. Also presentation of results in annual and international conferences of University of Latvia, and scientific conferences, organized by Daugavpils University. Of foreign countries, Nordic countries, Estonia, Lithuania and Russia should be noted.

At Latvia University of Life Sciences and Technologies an *internal quality assurance system* is implemented. Internal quality management mechanism of Doctoral studies:

- Designation of scientific supervisor for Doctoral thesis. It is performed by LBTU Council of Science, considering that a habilitated Doctor of science or a Doctor of science who performs research in his/her discipline of science (sub-sector), which is approved by publications and participation in scientific conferences, can be a scientific supervisor of Doctoral thesis.
- Elaboration and approval of Doctoral student’s individual work plan. Doctoral student, in collaboration with his/her scientific supervisor, elaborates this plan for current academic year and gets approval from the director of Doctoral programme and representative (chairman) of Doctoral council.

- Doctoral student's scientific activities are evaluated in the respective department's sessions of academic staff, twice in an academic year, emphasizing on parts of Doctoral student's studies that need to be activated;
- At the end of current academic year, Doctoral student writes a review on accomplishments of the academic year. The review, along with study plan for the next year, is discussed and approved in the session of Forest faculty council. The approved review and work plan for the next academic year have to be submitted in LBTU Doctoral section by the Doctoral student;
- At the end of studies Doctoral student submits a summary on accumulated CP, in Doctoral section, which is then being approved by the director of Doctoral study programme, and, based on that, Doctoral section issues a correspondent document – certificate on completion of theory part of Doctoral studies.
- Evaluation of Doctoral students work results is a part of quality management mechanism of Doctoral studies, which is implemented twice a year by a tender (rotation) commission in accordance with regulations on tender procedure for state budget-funded seats of Doctoral study programmes.
- Quality pre-evaluation of Doctoral thesis in extended academic session of the department. The pre-evaluation is equated to the utmost to the defence of Doctoral thesis in Doctoral council. After presentation of Doctoral thesis, hearing of opinions of three reviewers, scientific supervisor and other participants of the scientific discussion, academic staff of the department makes a decision on readiness for defence of necessity for quality improvement of Doctoral thesis, voting by show of hands.