Directive No. 2/2019 of the Dean of FT TUL

Organisation of studies in the doctoral study programme TEXTILE ENGINEERING, study programme Textile Technology and Materials Engineering P3106; doctoral study programme Textile Engineering P0723D270002 and doctoral study programme INDUSTRIAL ENGINEERING P0723D270001

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Article 1
Legislative framework

In accordance with Section 47 of Act No. 111/1998 Coll., on Higher Education (hereinafter referred to as "the Act") and Articles 18 and 19(1) of the Study and Examination Regulations of the Technical University of Liberec (hereinafter referred to as "the TUL SED"), the following rules are laid down for the organisation, conduct and evaluation of studies, including the organisation of the State Doctoral Examination (hereinafter referred to as "the SED") and the defence of the dissertation.

Article 2
Study obligations

1. Study in the doctoral study programme (hereinafter referred to as "DSP") in accordance with Article 18 of the TUL CGS is carried out according to an individual study plan (hereinafter referred to as "ISP") under the guidance of a supervisor and possibly with the participation of a consultant, who is appointed and dismissed by the dean for a given student after discussion in the disciplinary board.
2. The standard duration of doctoral studies is 4 years for both full-time and combined forms of study. The maximum duration of study is nine years in accordance with Article 10 of the TUL SER.
3. The ISP determines the subjects and their time and content sequence, the method of verifying the DSP student's study results in accordance with the study programme, the teaching activity determined by the head of the training centre, the topic of scientific research or creative activity in the field of research, development, the framework definition of the topic as the basis of the dissertation, possible study and practice at other departments, including foreign ones. The ISP is drawn up by the supervisor in agreement with the DSP student. The supervisor submits the ISP for approval to the departmental board (form - Individual Study Plan of the DSP student) within one month after the start of the study. Once approved, the ISP is binding.
4. To complete the study part, students take exams in the following five study areas. It is recommended that the order of the subjects be maintained when compiling the ISP. In Strands I to III, students choose at least one of the sub-areas listed. The distribution of accredited courses into the strands is given in Annex 1.

TEXTILE ENGINEERING

I. SCIENTIFIC BASIS:

- numerical and applied mathematics
- probability theory and mathematical statistics.

II. APPLIED BASIS:

- selected parts of applied chemistry,
- selected parts of applied physics,
- applied mechanics

III. FUNDAMENTASS OF THE FIELD:

- textile materials,
- textile technology,
- metrology.

INDUSTRIAL ENGINEERING

I. SCIENTIFIC BASIS:

- selected parts of numerical and applied mathematics,
- probability theory and mathematical statistics,
- modelling of complex systems

II. APPLIED BASIS:

- selected parts of quality management,
- metrology,
- quality assessment.

III. FUNDAMENTASS OF THE FIELD:

- selected parts of materials engineering,
- textile materials,
- textile technology.

IV. SPECIALISATION IN THE FIELD

The student preferably chooses from the offer of accredited courses in the doctoral study programmes of TUL. The course content is determined by the Dean of the Faculty on the basis of the supervisor's proposal approved by the Faculty Board so that the content is related to the specified topic of the doctoral dissertation. In the ISP, the doctoral student is provided with: the basic requirements for this examination (the topic of the examination, possibly recommended study literature and other requirements) and the topic of the written study, which is usually related to the dissertation topic. The length of the thesis is approximately 20 pages. The study is available to the examination committee at least 14 days before the examination.

V. EXPERIMENTAL TECHNOLOGY IN THE FIELD

The content of the course is determined by the Dean of the Faculty on the basis of the supervisor's proposal approved by the Faculty Board so that the content is related to the assigned topic of the doctoral dissertation and is tied to the completion of a foreign or intersectoral internship, usually outside the home university. Further specifications are given in Article 6 of this Directive.

5. Subjects for individual study areas, their contents and study literature are listed in the IS STAG and also in Annex 1 of this Directive.
6. Students prepare for the prescribed examinations in the subjects in the ISP by attending lectures, seminars or workshops within the scope of the chosen subject or by independent study in accordance with the ISP. The standard study period must be respected when fulfilling study obligations. Successful completion of the study part is considered to be the completion of at least three examinations within 24 months and the fulfilment of other study and other obligations in accordance with the ISP. In the event of non-fulfilment of study obligations without serious reasons, the study is terminated in accordance with Section 56(1)(b) of the Act and Article 33(2) of the TUL CPR.
7. Examinations are taken before a committee appointed by the Dean on the proposal of the supervisor. The board for the partial professional examinations is composed of at least three members. The examinations are conducted by the subject supervisor, in the presence of the supervisor, the chairperson and possibly other experts (form - Proposal for the composition of the DSP examination committee). A record of the result of the examination is made (form - Record of the DSP examination).
8. The ISP is approved by the Sectoral Council.
9. Control of the fulfilment of study obligations is continuous. Every year, no later than 15 September of the calendar year, students submit an annual evaluation (form - Annual Evaluation of the DSP Student) and submit an update of the ISP on the prescribed form - Annual Study Plan of the DSP Student (hereinafter referred to as "RSP"). The results of their work and the progress in the dissertation are presented by the student at a workshop for doctoral students, which is organized for this purpose.

10. The annual evaluation of the doctoral student prepared by the student, the supervisor, and the head of the training institute and completed by the study department is discussed by the departmental board, which then submits it to the dean.
11. The student must apply to take the SDZ in the third year of study, otherwise his/her studies will be terminated in accordance with Section 56(1)(b) of the Act and Article 33(2) of the TUL CPR. In exceptional cases, the dean decides to postpone the application date based on the student's request.
12. The dates of the SDZ are usually in accordance with the dates of the SZZ, which are determined by the teaching schedule of the respective academic year.
13. The student submits the application form to the study department (form - Application for the SDZ). The date of the SDZ will be arranged and published by the study department. An integral part of the application form is:
    a) the opinion of the supervisor in terms of recommending or not recommending the holding of the SDZ,
    b) written thesis in the prescribed structure and format, which is available from the website (model - Thesis),
    c) the list of examinations is available in IS STAG, if necessary the student submits copies of all records from the partial professional examinations including the Experimental Technique of the field (practice).
14. The organisation of the SDZ is governed by Article 22 of the TUL SER.

Article 3
Dissertation.

1. The dissertation must contain the original results of the doctoral student's independent work. The content and form of the dissertation shall conform to the conventions of publishing scientific results in the field.
2. The conditions and requirements for dissertations are set out in Article 23 of the TUL CPR and the current Rector's Directive on the Uniform Regulation and Publication of Bachelor's, Master's, Rigorous, Dissertation and Habilitation Theses.
3. In the case of an exceptionally successful publication activity of a doctoral student, the dissertation may be written in the form of a set of publications related to the given title of the thesis. Such a thesis must contain the doctoral candidate's original results, meet the general requirements for a dissertation according to the CPR and the following requirements:
    a) The dissertation contains at least 4 published publications, published in impacted journals of quartile 1 or 2 (according to the Web of Science database). The set of publications cannot include publications published before the start of the study.
    b) The PhD student is the first author or second author of at least two submitted publications.
    c) The dissertation is monothematic and consistent. The publications cover a common theme, which is also the topic of the thesis.
    d) The thesis contains a summary introduction and common conclusions of at least 30 pages in total. The dissertation includes the full texts of the submitted publications.
4. The student submits an application for the dissertation defence on the prescribed form to the study department (form - Application for dissertation defence). The date of the defence will be arranged and published by the study department.

   An integral part of the application for the dissertation defence are:
    a) copies of the dissertation in the final version and editing according to the binding structure and in the prescribed format in accordance with the TUL directive in printed and electronic form (Model of title pages of theses), documents for the dissertation abstract in the prescribed structure and according to the model in electronic form (model - Dissertation abstract), printing in the required number of copies will be provided by the study department,

b) a statement from the supervisor recommending or not recommending the dissertation for defence,
c) list of publications of the DSP student
d) structured professional CV of a DSP student,
e) the list of examinations is available in IS STAG, if necessary, the student submits copies of all records of partial professional examinations, including the Experimental Technique of the field (practice) and SDZ.

5. The organisation of the dissertation defence is governed by Articles 23 to 25 of the TUL SER.According to Article 19(5) of the TUL SER, the deadline for submitting an application for the defence of a dissertation is six years after enrolment, unless the Dean stipulates otherwise in exceptional cases.
6. In accordance with Article 25, Paragraph 16 of the TUL CPR, a student may repeat the dissertation defence once after the dissertation has been revised after a maximum of 6 months.

Article 4
Research and publication activities

1. The dissertation must contain original research results. The dissertation is the result of a specific scientific task, which means the student's participation in external or internal research projects of the training institute related to the topic of the dissertation.
2. The original published results of the student's research activities are also part of the dissertation in accordance with Article 23(3)(d) of the TUL CPR, especially in peer-reviewed scientific journals. The student shall consult the publications with his/her supervisor.
3. Students present the results obtained during the dissertation research mainly in journals, at student scientific conferences and at international conferences. Three results meeting the conditions for inclusion in the Research, Development and Innovation Information System (RIV) are considered to be the minimum number of publications (in the sense of original results) when applying for the defence of a dissertation. Of these, at least one must be a publication in an impacted or peer-reviewed scientific journal with the student as the main author.

Article 5
Pedagogical activity

1. Part of the study duties is also teaching, which is stipulated in the ISP. As part of the teaching practice, students conduct exercises under the supervision of professional supervisors or teachers, usually 4 hours (two teaching blocks) per week.
2. The student participates in the consultation of semester, bachelor's and master's theses of bachelor's and master's students.
3. In the event that it is not possible to prescribe the pedagogical guidance of the exercise in the minimum scope to the student, it is replaced by another activity in the same scope related to the professional activity of the training institute. The activities implemented by the student shall be reported in the annual evaluation.

Article 6
Intersectoral and international mobility

1. Part of the fulfilment of study obligations is to complete a six-month study internship during the standard period of study, usually outside TUL at other university, scientific research or partner institutions, preferably abroad, e.g. within the framework of Erasmus, bilateral agreements between the Faculty and other foreign institutions. The internship can be spread over several shorter stays.
2. The focus, implementation and administration of the internship is to be consulted by the student with the supervisor, the study department, the TUL foreign department or the Erasmus office. The student submits the thematic assignment and the date of the placement to the ISP for approval. The details of the internship - topic, objectives, organizational conditions, method of financing - are submitted by the student for approval within the RSP.

3. The following must be documented before departure:
   a) the thematic focus of the internship, including a timetable of work and planned outputs,
   b) confirmation of acceptance of the traineeship by the host organisation,
   c) method of implementation and financing (departure and arrival dates, calculation of financial requirements).
4. Upon return, you must provide proof of:
   a) confirmation of the placement from the host institution,
   b) a partial travel report if it is a partial fulfilment of a six-month traineeship.
5. Presentation of outputs from the internship - the output is a report discussing the course of the internship in terms of the experimental results obtained and their processing as part of the dissertation solution and the benefits of the newly acquired knowledge and experience of the student (recommended length 20 pages). The report can be replaced by a manuscript of the publication where the student is listed first and ready to be submitted. The report shall be available to the examination committee at least 14 days before the EXPERIMENTAL ENGINEERING OF THE FIELD examination, before which the student presents and defends the results obtained. The student submits the material to the study department in the required number of copies and in electronic form and the study department forwards it to the board.

Article 7
Duties of full-time doctoral students

1. The student is obliged to fulfil his/her study obligations in cooperation with the supervisor, consultant and the head of the training centre.
2. In order to deepen theoretical knowledge in their chosen field of study, students of the doctoral study programme participate in seminars organized for this programme, conferences, and other professional events.
3. The full-time form of study in the DSP is carried out at a workplace that guarantees the student's individual study plan and organises the student's activities and stay at the workplace. Students are obliged to be available at TUL during the standard study period according to predefined conditions, which are determined by the head of the department and the supervisor and correspond at least to the time between 9:00 and 14:00. Attendance records are kept by the secretariats of the training departments.
4. The student is obliged to report short-term absence at the workplace in advance, not only to the trainer, but also to the head of the training centre (by phone, email).
5. If the student plans to travel for more than 1 week (conference, internship, vacation according to the academic year schedule), it is necessary to inform the supervisor, the head of the department and the study department in writing (preferably by email).
6. Students in full-time and standard period of study may be awarded a scholarship. Its amount is specified in a separate directive of the Dean. In the event of non-fulfilment of study and other obligations or failure to respect the binding rules, the scholarship may be suspended or reduced by decision of the Dean.

Article 8
Final provisions

1. This Directive cancels the Dean's Directive No. 2/2019 version 02.
2. Discussed by the Doctoral Study Programme Board of Textile Engineering and Industrial Engineering on 26 October 2022 and by the Academic Senate of TUL on 7 November 2022.
3. Accreditation of the doctoral study programme Industrial Engineering was discussed on 27 November 2017 by the Scientific Council of the Faculty of Textiles of the Technical University of Liberec, on 4 December 2017 by the Council for Internal Evaluation of TUL, on 26 April 2018 by the Council of the National Accreditation Office for Higher Education and by the Academic Senate of FT TUL on 8 February 2019.

PhD Study Programme P3106 – Textile Engineering

Branch: Textile Technics and Material Engineering

I. BASICS OF NATURAL SCIENCE — compulsory optional subjects (B)

Course Title	Abbreviation	Scope	Completion	Year	Semester
Mathematical Statistics and Data Analysis	KAP/D02	2+0	Exam	1	WS
Numerical Methods	KAP/D40	2+0	Exam	1	WS
Differential Equations	KAP/D41	2+0	Exam	1	SS

Student chooses 1 subject from the offer.

II. BASIC OF APPLIED SUBJECTS — compulsory optional subjects (B)

Course Title	Abbreviation	Scope	Completion	Year	Semester
Macromolecular Chemistry	KNT/D18	2+0	Exam	1	WS
Mechanics of Fibrous Assemblies	DFT/D43	2+0	Exam	1	WS
Optics of Solids	KMI/D05	2+0	Exam	1	WS
Structural Mechanics of Fibrous Ass.	KTT/D51	2+0	Exam	1	WS
Physical-Chemistry Modelling	DFT/D42	2+0	Exam	1	SS
Heat and Mass Transfer in Porous Media	KHT/D17	2+0	Exam	1	SS
Textile Machines Dynamics	DFT/D44	2+0	Exam	1	SS
Hydrodynamics Process of Spinning	KCH/D131	2+0	Exam	1	WS, SS

Student chooses 1 subject from the offer.

III. MAIN SUBJECTS OF THE FIELD — compulsory optional subjects (B)

Course Title	Abbreviation	Scope	Completion	Year	Semester
Nanofibres and Nanotechnologies	KCH/NN	2+0	Exam	2	WS
Clothing Comfort	KHT/D52	2+0	Exam	2	WS
Practical Stereology	KCH/D130	2+0	Exam	2	WS
Sorption Processes	KMI/D13	2+0	Exam	2	WS
Structure and Properties of Textile Fibers	KMI/D07	2+0	Exam	2	WS
Structural Theory of Fibrous Assemblies	KTT/D11	2+0	Exam	2	WS
Textile Chemistry	KMI/D24	2+0	Exam	2	WS
Tissue Engineering	KCH/D138	2+0	Exam	2	WS
Chemical and Thermal Technologies of Nonwovens	KNT/D25	2+0	Exam	2	SS
Textiles Projection	KMI/D20	2+0	Exam	2	SS
Simulation of the Apparel Processes	KOD/D15	2+0	Exam	2	SS
Simulation in Material Engineering	KNT/D21	2+0	Exam	2	SS
Theoretical Textile Metrology	KMI/D08	2+0	Exam	2	SS
Image Processing and Analysis	KHT/D54	2+0	Exam	2	SS
Transport Phenomena of Forming	KOD/D16	2+0	Exam	2	WS, SS

Student chooses 1 subject from the offer.

IV. SPECIALIZATION IN THE FIELD **compulsory optional subjects (B)**

Course Title	Abbreviation	Scope	Completion	Year	Semester
Specialization in the field	DFT/D30	2+0	Exam	**3**	**N**

The student selects preferably from the offer of accredited courses in the doctoral study programmes of TUL

V. EXPERIMENTAL TECHNIQUE OF THE TEXTILE **compulsory optional subjects (B)**

Course Title	Abbreviation	Scope	Completion	Year	Semester
Experimental technique in the field	DFT/D33	2+0	Exam	**3**	**WS**

The student must complete the course.

INTERNSHIPS **Optional subjects (C)**

Course Title	Abbreviation	Scope	Completion	Year	Semester
Internship in a company I	DFT/D60	12T	CC	**3**	**WS, SS**
Internship in a company II	DFT/D61	12T	CC	**3**	**WS, SS**
Internship abroad I	DFT/D62	12T	CC	**3**	**WS, SS**
Internship abroad II	DFT/D63	12T	CC	**3**	**WS, SS**

CC = Course Credit

Students can choose and study other subjects, which extend their knowledge portfolio and allow them to expand their competencies. These subjects are optional and are not counted to the fulfilment of study duties.

Doctoral study programme P0723D270002 - Textile Engineering

I. BASICS OF NATURAL SCIENCE — compulsory optional subjects (B)

Course Title	Abbreviation	Scope	Completion	Year	Semester
Applied Mathematics (selected topics)	KAP/D125	2+0	Exam	1	WS
Physics of Polymers	KCH/D132	2+0	Exam	1	WS
Macromolecular Chemistry	KNT/D122	2+0	Exam	1	WS
Mathematical Statistics and Data Analysis	KAP/D126	2+0	Exam	1	WS
Mechanics of the Continuum	KTT/D133	2+0	Exam	1	WS

The student chooses one course from the offer.

II. BASIC OF APPLIED SUBJECTS — compulsory optional subjects (B)

Course Title	Abbreviation	Scope	Completion	Year	Semester
Hydrodynamics Process of Spinning	KCH/D131	2+0	Exam	**1**	**WS, SS**
Optics of Solids	KMI/D118	2+0	Exam	**1**	**WS**
Structure and Mechanics of Fibrous Ass.	KTT/D109	2+0	Exam	**1**	**WS**
The Finite Element Method	KTT/D108	2+0	Exam	**1**	**WS**
Heat and Mass Transfer in Porous Media	KHT/D134	2+0	Exam	**1**	**SS**
Textile Machines Dynamics	KMP/D135	2+0	Exam	**1**	**SS**

The student chooses one course from the offer.

III. MAIN SUBJECTS OF THE FIELD — compulsory optional subjects (B)

Course Title	Abbreviation	Scope	Completion	Year	Semester
Comfort of Clothes	KHT/D107	2+0	Exam	**2**	**WS**
Practical Stereology	KCH/D130	2+0	Exam	**2**	**WS**
Sorption Processes	KMI/D121	2+0	Exam	**2**	**WS**
Structure and Properties of Textile Fibers	KMI/D136	2+0	Exam	**2**	**WS**
Structural Theory of Fibrous Assemblies	KTT/D137	2+0	Exam	**2**	**WS**
Technology of Nanofibers Production	KNT/D123	2+0	Exam	**2**	**WS**
Textile Chemistry	KMI/D120	2+0	Exam	**2**	**WS**
Tissue Engineering	KCH/D138	2+0	Exam	**2**	**WS**
Transport Phenomena of Forming	KOD/D139	2+0	Exam	**2**	**WS, SS**
Chemical and Thermal Technologies of Nonwovens	KNT/D140	2+0	Exam	**2**	**SS**
Textiles Projection	KMI/D141	2+0	Exam	**2**	**SS**
Simulation of the Apparel Processes	KOD/D111	2+0	Exam	**2**	**SS**
Testing Theory and Experimental Data Treatment	KMI/D113	2+0	Exam	**2**	**SS**
Image Processing and Analysis	KHT/D106	2+0	Exam	**2**	**SS**

The student chooses one course from the offer.

IV. SPECIALIZATION IN THE FIELD **compulsory optional subjects (B)**

Course Title	Abbreviation	Scope	Completion	Year	Semester
Specialization in the Field	DFT/D30	2+0	Exam	**3**	**N**

The student selects preferably from the offer of accredited courses in the doctoral study programmes of TUL

V. EXPERIMENTAL TECHNIQUE OF THE TEXTILE **compulsory optional subjects (B)**

Course Title	Abbreviation	Scope	Completion	Year	Semester
Experimental technique of the Textile	DFT/D33	2+0	Exam	**3**	**WS**

The student must complete the course.

INTERNSHIPS **optional subjects (C)**

Course Title	Abbreviation	Scope	Completion	Year	Semester
Internship in a Company I	DFT/D60	12T	CC	**3**	**WS, SS**
Internship in a Company II	DFT/D61	12T	CC	**3**	**WS, SS**
Internship Abroad I	DFT/D62	12T	CC	**3**	**WS, SS**
Internship Abroad II	DFT/D63	12T	CC	**3**	**WS, SS**

CC = Course Credit

Students can choose and study other subjects, which extend their knowledge portfolio and allow them to expand their competencies. These subjects are optional and are not counted to the fulfilment of study duties.