

SZENT ISTVÁN UNIVERSITY

DOCTORAL SCHOOL OF MECHANICAL ENGINEERING

Head of School:
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TRAINING PLAN

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General guidelines

The educational work of the DS is organized and directed by the TEC (Training and Evaluation Committee, point 2.6.1) with the contribution of the research group leaders based on the Credit-based Uniform Study and Examination Regulations of the Doctoral Schools of SZIU.

Full-time and correspondence students continue their studies for four semesters, and must complete a total of 120 credits. The model curriculum fixed in Annex 2 can be deviated from by 10% annually in justified cases.

The student is obliged to register for and enroll in the subjects by September 30 in the autumn semester, and by February 28 in the spring semester.

Students are required to attend the classes according to the curriculum agreed upon with the subject lecturer. The course material must be accounted for in the form prescribed in the curriculum (see Appendix 1). The exam takes place before the subject lecturer.

The autumn semester must be completed by February 15, and the spring semester by September 15.

The DIT (Doctoral School Council) decides on partial training abroad upon the recommendation of the supervisor and the TEC.

The curriculum of the research groups of the Doctoral School of Mechanical Engineering is contained in Annex 2, and its subjects in Annex 3. The DIT is entitled to change this based on the proposal of the Head of the DS.

Structure of the educational-research program of the Doctoral School

Of the 120 credit points prescribed for doctoral students during the training period, they can obtain 41 points by fulfilling examination obligations, 8 points by teaching activities, and the rest can be completed by research work carried out during the training period. The various activities that can be continued during the training period have been divided by the DS into course units as follows. The minimum required points can be obtained based on these.

Course unit marked 'I.' means the completion of the prescribed subjects. This includes the registration of subjects, their attendance in contact hours, and the fulfillment of the examination obligation.

The 'A' subjects of the Doctoral School of Mechanical Engineering are those that cover the general disciplines of research, and technical research – essential for the students of both research groups. These subjects are mandatory for all state-funded and correspondence students belonging to the DS.

The 'B' subjects, building on the previous 'A' subjects, provide help in answering the theoretical and methodological questions of the research going on in the given research group. These subjects are mandatory for the students of the given research group.

The 'C' topic-specific subjects are primarily related to the specific research topic. Students of both research groups can choose freely from these, but the minimum number of subjects to be taken is

prescribed. The 'C' subjects can be taken with the agreement of the supervisor, which is verified by their signature. Subjects can also be taken from other doctoral schools, which – after prior consultation – can replace the 'C' subjects of the DS. Possibly, a 'B' subject of one research group can be taken as a 'C' subject by a student of the other research group.

Course unit marked 'II.' means the teaching work of the student during the training period, which is university or college teaching activity (classroom or laboratory practices) related to the doctoral student's research topic. The DS expects a minimum of two hours per week per semester, for which two credit points are awarded (see the model curriculum in Annex 2). The DS accepts this with the joint certification of the institute director and the supervisor (form 7), based on which the president of the TEC certifies it in the doctoral student's course record book. If the doctoral student performs the teaching activity at another university or college, the completion of the subject is certified by the dean of the institution and the supervisor.

Course unit marked 'III.' means the research work during the training period, which consists of research work evaluated as described in chapter 5.

Course unit marked 'IV.' refers to the student's publication activity. The point system for evaluating the publication activity is contained in Annex 5. Four times the points calculated on this basis is the credit point that can be accounted for it.

Table 1 summarizes the prescribed obtainable and compulsorily obtainable credit points.

Table 1 Credit points belonging to the course units

Course unit sign	MTDI required limits (credit point) minimum	MTDI required limits (credit point) maximum
I. Completion of subjects	41	
II. Teaching work	0	8
III. Research work		43
IV. Publication activity	28	50

A non-doctoral student who does not have the opportunity to carry out teaching activity in a higher education institution may present their work to the audience within the framework of the teaching activity of the supervisor's institute, for which they can receive teaching credit points, otherwise they can only replace the points obtainable by completing course unit II with the work done in course unit IV. Those who cannot complete the research work according to course unit III to 100% can also make up for their lost scores with their work done in course unit IV.

The previously presented subject structure of the DS and its curricula are contained in Annex 3. The subjects taught in the Doctoral School are briefly presented in Annex 4.

Complex exam

The training phase is closed by a two-part complex exam, the successful completion of which is a condition for entering the Research and dissertation phase.

For the theoretical part of the complex exam, the Doctoral School Council determines two subjects (topics) fitting the research topic for the examinee upon admission to the exam.

In the dissertation part of the complex exam, the examinee gives an account of their literature knowledge in the form of a presentation, reports on their research results, outlines their research plan for the second phase of the doctoral training, and the scheduling of the preparation of the dissertation and the publication of the results.

The examination board evaluates the theoretical and dissertation parts of the exam separately. A record containing a textual evaluation is prepared of the complex exam. The result of the exam must be announced on the day of the oral exam. The complex exam is successful if the majority of the board members consider both parts of the exam successful. In case of an unsuccessful theoretical exam part, the examinee may repeat the exam one more time in the given examination period from the uncompleted subject(s). In case of failure, the dissertation part of the exam cannot be repeated in the given examination period.

The absolutorium

In the DS, after the completion of the training, its fulfillment is certified by the absolutorium. The higher education institution issues a final certificate (absolutorium) to the doctoral student who has obtained the prescribed credits in the doctoral training.

Checking the doctoral student's research work

The DS generally contributes to the successful elaboration of the research topic as follows:

- provides professional support in specific methodological questions of the research,

- ensures laboratory and plant experimental opportunities as needed,

- supports the publication of research results and their presentation at conferences,

- helps organize partial training opportunities abroad, taking into account the topic and the language skills of the doctoral student.

The specific assistance of the research work is the task of the supervisor. The DS helps the research work with continuous accountability and reporting.

Accordingly, doctoral students must fulfill the following tasks:

- By the end of November of the first year, a Work Plan signed by the supervisor must be submitted according to form 8.4. The DS assigns the submitted work plan to a reviewer, who presents their review at the February meeting of the DIT. Here the doctoral student must defend their ideas. A work plan modified taking into account what has been said enters into force, the implementation of which changes is checked by the supervisor, and possibly countersigned by the reviewer;

- By February 28 of the first year, a Literature Summary (see form 8.8) must be submitted in writing by the doctoral student, which is qualified by the head of the DS or their assignee. This can happen by returning it for correction or giving 10-18 points depending on the value of the work. The literature summary must contain a critical analysis of the publications related to the topic, revealing those areas where there are contradictions or unclear questions as described in form 8.8;

- By January 15 of the second year, a Research Report containing the doctoral student's research results up to that point, consolidated into a uniform structure (see form 8.9), must be submitted in writing, which must be presented and defended at an in-house conference before the TEC, fellow doctoral students, and possibly invitees from other doctoral schools. The annex to the report is a list of the doctoral student's publications related to the topic. The committee evaluates the submitted material (which has already been reviewed by a reviewer appointed by the DIT), the presentation, and the professional debate conducted, and awards points for it. If the doctoral student does not receive 50% of the obtainable score, they must submit a new report at a suitable time and defend it again. If they receive more than 50% but less than the obtainable score, they can make up for the lost score with publications to obtain the absolutorium. (The presentations given at the in-house conference are published in print by the DS, but these do not count as publications). Those who do not submit the research report on time can make up for it next year at the latest. In this case, the final report can be submitted no earlier than six months after this.

- By the end of the second year, the results achieved so far must be submitted in writing in the form of a Final Research Report, consolidated into a uniform structure. The written material must contain a list of the doctoral student's publications related to the topic in an annex. The material must also contain further specific tasks to be performed until the preparation of the dissertation, as well as the planned thesis points of the dissertation. The preparation of the Final Research Report at an appropriate level (which is reviewed by the Quality Control Subcommittee) is a criterion condition for admission to the complex exam. Subsequently, as part of the complex exam, the Final Research Report must be defended within the framework of an oral presentation.

Publication practice of the Doctoral School
The evaluation of the doctoral student's publication activity is carried out as follows.

A publication can be considered to be of scientific value if it appears in the journals, publications, or other authoritative journals listed in Annex 7, and in which there are demonstrably substantive own result(s) characteristic of the given field of science.

In addition to the listed journals, authoritative journals are also those that have an editorial board and the authors also attach an English summary.

The DIT does not accept a publication published in a daily or weekly newspaper as a publication of scientific value, however, it has a place in the listing of literary activity – in the other category, since it also refers to professional public life activity and habitus.

Accountability system of the Doctoral School
Training (Maximum obtainable score: 49 credits)

In order to fulfill the training conditions, the registered subjects (41 credits) must be completed by March 1 (at the latest), and September 10 (at the latest).

- every semester is closed by March 10, and September 20 respectively

- anyone who does not complete a registered subject is deleted, and takes the subject again.

The teaching activity (4 x 2 = 8 credits) must also be certified by March 1, and Sept. 1 respectively.

The certificate is provided by: internally the head of department, at an external institution the director general (dean)

Those who do not work in an educational institution do not need a certificate

The teaching activity is entered in the index by the educational head of the DS

- anyone who does not complete or certify the teaching activity can only make up for their missing credits with publications.

Research (Maximum score: 43 credits)

The summaries (literature summary, research report, final report) must be completed within the prescribed time.

Literature summary (18 credits, minimum 10 credits to be achieved)

- its submission is a condition for issuing the absolutorium;

- its qualification is given as a percentage by the quality manager of the DS, and the score is determined based on this;

- the qualifier can return the work for correction - in case of performance below 50%; in this case its maximum qualification can be 60%.

- those who do not submit it by the deadline can get a one-month extension with a deduction of 5 credit points;

- after this, it can be submitted with a deduction of 10 credit points;

- lost points can be made up with extra publications.

Research report (in-house conference) (25 credits, minimum 13 credits to be achieved)

- its material is published in an internal publication by the time of the conference, before which the leadership of the DS judges its acceptability, or returns it for correction if necessary;

- the committee established for this purpose qualifies it by scoring;

- lost points can be made up with extra publications.

Final research report

- its submission is a condition for admission to the complex exam, and the issuing of the absolutorium;

- its qualification is carried out by the quality manager of the DS with a "passed", or "failed" rating; in the latter case the candidate gets the work back for correction.

Publications

- the list and a copy of the publications must be submitted continuously electronically (in scanned format) upon publication;

- anyone who does not complete the publication activity in the prescribed semester can make it up by the end of the training research phase;

- the credit value of the publication score is four times the score; a minimum of 28, a maximum of 50 credits can be completed;

- its qualification is submitted by the head of the TEC for decision to the leadership of the DS.

- the candidate must also present the achieved results in at least three domestic and two foreign scientific peer-reviewed journal articles within the minimum publication score.

ANNEX 2
Curriculum of the Doctoral School

Curriculum of the Doctoral School of Mechanical Engineering*

Curriculum of the Agricultural Energetics and Environmental Technology research group

Year I. Semester 1			Year I. Semester 2		
Subject	*Hour	Credit	Subject	*Hour	Credit
General research methodology (A)	30	5	Theory and practice of technical research (A)	30	5
Research ethics (A)	30	5	Design of experiments (A)	30	5
Material and energy transport processes (B)	30	4	Environmental technology (B)	30	4
Compulsorily chosen C subject	30	3	Compulsorily chosen C subject	30	3
Teaching activity	30	2	Literature summary	-	18
			Teaching activity	30	2
Total credits:		19	Total credits:		37
Year II. Semester 3			Year II. Semester 4		

Subject	*Hour	Credit	Subject	*Hour	Credit
Modeling and simulation of energetic processes (B)	30	4	Research report	-	25
Compulsorily chosen C subject	30	3	Teaching activity	30	2
Teaching activity	30	2	Publication		8
Publication	-	20			
Total credits:		29	Total credits:		35

Course units:

Training:	41
Teaching activity:	8
Research:	43
Publication:	28
Total credits during training:	120

* Classroom engagement

Curriculum of the Agricultural machinery basics research group

Year I. Semester 1			Year I. Semester 2		
Subject	*Hour	Credit	Subject	*Hour	Credit
General research methodology (A)	30	5	Theory and practice of technical research (A)	30	5
Research ethics (A)	30	5	Design of experiments (A)	30	5
Mechanical analysis of agricultural machinery structures (B)	30	4	Differential equations (B)	30	4
Compulsorily chosen C subject	30	3	Compulsorily chosen C subject	30	3
Teaching activity	30	2	Literature summary	-	18
			Teaching activity	30	2
Total credits:		19	Total credits:		37
Year II. Semester 3			Year II. Semester 4		
Subject	*Hour	Credit	Subject	*Hour	Credit

Materials science (B)	30	4	Research report	-	25
Compulsorily chosen C subject	30	3	Teaching activity	30	2
Teaching activity	30	2	Publication		8
Publication	-	20			
Total credits:		29	Total credits:		35

Course units:

Training:	41
Teaching activity:	8
Research:	43
Publication:	28
Total credits during training:	120

* Classroom engagement

ANNEX 3

Subjects of the Doctoral School

Subject structure of the Doctoral School of Mechanical Engineering (from 2016)

No.	Subject	Lecturer
"A" subject group (5 credits)		
1.	Theory and practice of technical research	József Gyulai, Academician
2.	Research ethics	Dr. István Gyürk, CSc, Univ. Prof.
3.	Design of experiments	Dr. Béla M. Csizmadia, CSc, Univ. Prof.
4.	General research methodology	Dr. Péter Szendrő, DSc, Prof. Emeritus
"B" subject group (4 credits)		
Agricultural energetics and environmental technology		
1.	Environmental technology	Dr. István Barótfi, CSc, Prof. Emeritus
2.	Material and energy transport processes	Dr. János Beke, DSc, Univ. Prof.
3.	Modeling and simulation of energetic processes	Dr. István Farkas, DSc, Univ. Prof.
Agricultural machinery basics		
1.	Mechanical analysis of agricultural machinery structures	Dr. László Fenyvesi, PhD, Univ. Prof.
2.	Materials science	Dr. Gábor Kalácska, DSc, Univ. Prof.
3.	Differential equations	Dr. Zoltán Varga, CSc, Prof. Emeritus

"C" subject group (3 credits)		
1.	Renewable energy sources	Dr. István Barótfi, CSc, Prof. Emeritus
2.	Drying theory	Dr. János Beke, DSc, Univ. Prof.
3.	Design of field experiments	Dr. László Bense, PhD, Univ. Docent
4.	Engineering application of finite element method	Dr. János Égert, CSc, Univ. Prof.
5.	Artificial intelligence	Dr. István Farkas, DSc, Univ. Prof.
6.	Systems engineering	Dr. Dezső Faust, CSc, Prof. Emeritus
7.	Optical stress analysis	Dr. Endre Gelencsér, PhD, Univ. Private Docent
8.	Integrated energetic systems of facilities	Dr. Györgyné Halász, PhD, Univ. Docent
9.	Economics of developments	Dr. István Husti, DSc, Univ. Prof.
10.	Interactions of machine design and manufacturing	Dr. József Janik, DSc, Prof. Emeritus
11.	Mechatronic systems	Dr. László Jánosi, CSc, Univ. Prof.
12.	Dynamics of machines	Dr. Ferenc Kaifás, DSc, Prof. Emeritus
13.	Technologies of polymer composites	Dr. Gábor Kalácska, CSc, Univ. Prof.
14.	Drive theory	Dr. László Kátai, PhD, Univ. Docent
15.	Mechanics of granular assemblies	Dr. István Keppler, PhD, Univ. Docent
16.	Food industry processes	Dr. Gábor Keszthelyi-Szabó, DSc, Univ. Prof.
17.	Terrain vehicle theory, vehicle dynamics	Dr. Péter Kiss, PhD, Univ. Prof.
18.	Ecological hydraulic engineering	Dr. János Major, PhD, College Prof.
19.	Solid-state physics	Dr. Csaba Mészáros, PhD, Univ. Docent
20.	Modern machine manufacturing technologies	Dr. István Pálinkás, CSc, Prof. Emeritus
21.	Hydraulic machines	Dr. István Patay, CSc, Univ. Prof.
22.	Modern structural materials and their recycling	Dr. Lajos Pék, CSc, Prof. Emeritus
23.	Electrical measurement of mechanical quantities	Dr. Károly Petróczki, PhD, Univ. Docent
24.	Physics of measurement sensors	Dr. István Seres, PhD, Univ. Docent
25.	Electric power management	Dr. Péter Sembery, CSc, Prof.

		Emeritus
26.	Theory of crop harvesting	Dr. István Szabó, PhD, Univ. Prof.
27.	Biophysics	Dr. András Szász, CSc, Univ. Private Docent
28.	Continuum mechanics	Dr. György Szeidl, DSc, Univ. Prof.
29.	Comminution theory	Dr. Péter Szendrő, DSc, Prof. Emeritus
30.	Environmental geotechnics	Dr. Gábor Telekes, CSc, College Prof.
31.	Modern animal husbandry technologies	Dr. László Tóth, DSc, Prof. Emeritus
32.	Wind and geothermal energy utilization	Dr. László Tóth, DSc, Prof. Emeritus
33.	Nanostructures and nanotechnologies	Dr. Ibolya Zsoldos, DSc, Univ. Prof.

The C subjects, and the B subjects of the other research group as C subjects, as well as courses of other doctoral schools, in each case with the C subject credit value determined by the Doctoral School of Mechanical Engineering, can only be chosen by the doctoral students with the agreement of the supervisor and the prior permission of the doctoral school management.