10. HU: Magyarország (Hungary)

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10.1. General information

The closest concept to information engineering is *műszaki informatika* (technical informatics). This curriculum is closest to electrical engineering among all the informatics curricula. *Programozó matematikus* (programming mathematician) and *programtervező matematikus* (programme designing mathematician) curricula are also offered, mainly by Faculties of Natural Sciences, while the *műszaki informatika* (technical informatics) curricula are traditionally offered by technical universities and polytechnics.
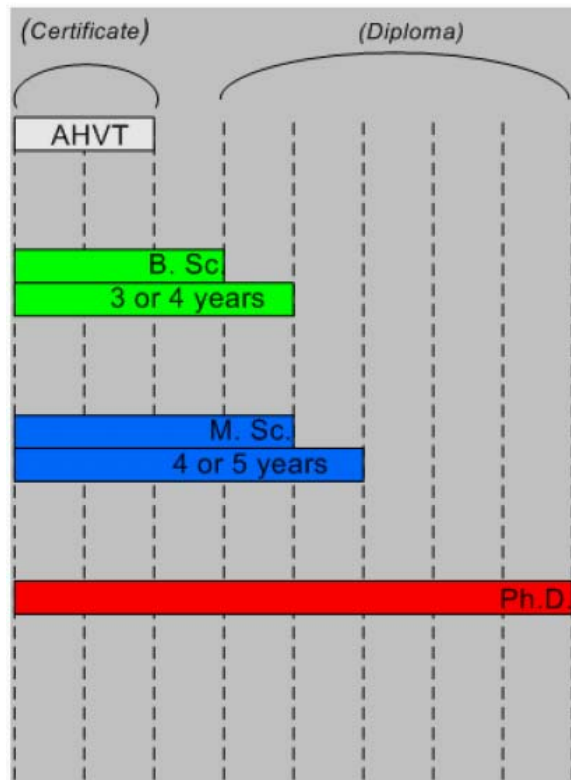

Figure 10.1: Hungarian Higher Education System in EIE disciplines.

The educational system of EIE in Hungary can be demonstrated most effectively by the comparison of the sequential and dual models (figure from Sima 2002):
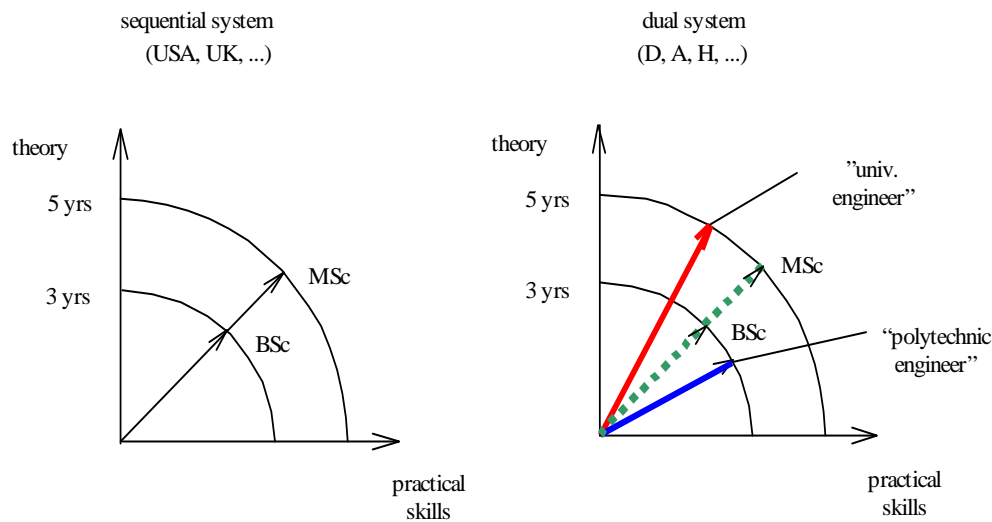

Figure 10.2: Hungarian sequential and dual systems.

The Hungarian higher education has 2 kinds of systems, there are colleges and universities (University entry = Competitive entry based on examination), some colleges are associated with universities as college faculties of the universities. A university can offer college level courses, too.

Percentage of population participants at universities and colleges in full-time education with respect to the corresponding age: 17.4 % (1999). Number of higher education institutions are 62 (30 state, 26 church and 6 foundation institutions).

The Hungarian dual-type system of higher education in technology was established in the 1960s. Several polytechnics were founded in Budapest and other cities in Hungary, one for electronics, one for light industry, one for machine industry etc. These institutions were similar to the German *Fachhochschulen*, but the distance in research activities between universities and polytechnics was smaller in the Hungarian model than in the German one.

Polytechnics typically offered 6/7 semester long courses with the degree "polytechnic engineer" (see figure 11.2) while universities had 10 semester long courses ending with the degree "university engineering". The type of course thus matched the type of institution.

The 1980s brought about significant changes. Some universities, in order to attract more students, introduced the two-cycle model. However, polytechnics did not have the option of starting "univ. engineering" courses; their students having obtained a "polytechnic degree" were usually unable to enter the fourth year of a university without previously passing of several extra examinations.

In the following decade a new law of higher education was accepted by the Parliament (in 1993, modified in 1996). This made it possible for a polytechnic to start the "university engineer" degree if the necessary conditions were fulfilled, which were checked by the Hungarian Accreditation Board (in Hungarian MAB). Another important factor was the higher education integration programme in 2000. As a result, the number and ratio of universities and polytechnics has changed. Before 2000 there were many small polytechnics and a few universities, now we have several integrated universities and not so many integrated polytechnics.

The current era regarding the Bologna process is that of discussions and preparations. Some people think that the two-cycle system can be introduced very simply by cutting the 5-year long university curriculum in two parts: the first three years would be the BSc part, and the extra two years the MSc part. However, after 3 years the students typically do not get the necessary training to be able to get jobs at the labour market (too much theory, not enough skills). However, after the 3 years of polytechnic training the students typically do not have the necessary theoretical foundations to further study for the MSc (not enough theory, too much skill work). In this respect, some convergence between the "university engineering" and "polytechnic engineering" arrows would be optimal.

10.1.1 *Electrical and Information Engineering in Hungary, boundaries of the field of study*

EIE is Electrical and Information Engineering
Main specialities : Electrical Engineering, Process Engineering (for Wood material), Engineering of processing technology, Material Engineering, Computing and Information Systems, Information Technology, Electrical Engineering and Informatics, Engineering Physics.

10.1.2 *Content, degrees and accreditations*

Higher education institutions must be recognised by the government (the parliament) and are under the supervision of the Ministry of Education. There are state universities and colleges, higher education institutions controlled by various churches (dominantly by the Catholic Church) and private colleges. The Hungarian Accreditation Committee (HAC) give opinions on the establishment or recognition of higher education institutions, establishment or abolition of fields of study (courses).

Standards of higher education and quality endorsement of the education are based on the operation of HAC and Scientific Council. The agreement of both structures is necessary for introduction of a new course. Qualification requirements, curricula, quality of the academic staff, financial aspects and regional distribution of the trainings are taken into account.

Academic year**:** The academic year consists of two semesters, the fall semester starts in September. The spring semester in February until the end of May (for 14-15 weeks) followed by a period of exams (generally 6 weeks). The number of weekly contact hours in engineering courses is nearly 40 hours/week.

10.1.3 *Implementation of the Bologna-BMD system in Hungary*

The government has fixed some goals to be achieved :

- Higher educational institutions take into account the tasks related to the inevitable consequences of the accession of Hungary to the European Union,
- Introduction of the credit system in all higher education institutions.

10.2. Figures on the weight of EIE in Hungary

In 2003, 62000 students will be admitted to first year studies to all higher education institutes in Hungary. This includes all faculties, all universities and colleges, but the number refers to places only that are state supported. Regarding places without support (this number is surely less than the previous one) it is difficult to get aggregate data.

In informatics there are 5000 places in the first year, 2000 at universities and 3000 at colleges. I have to point out that the two/cycle training has not yet been introduced, though the process is going on. Thus these 2000 are pursuing an MSc, the 3000 a BSc. In technical areas there are 3000 places for universities, 4500 for colleges. But these include all technical areas, special data just for electronics are not available in aggregate format, but you can have the details where the individual faculties are listed.

Source: Felsőoktatási felvételi tájékoztató, Oktatási Minisztérium, 2003. 06. 02.
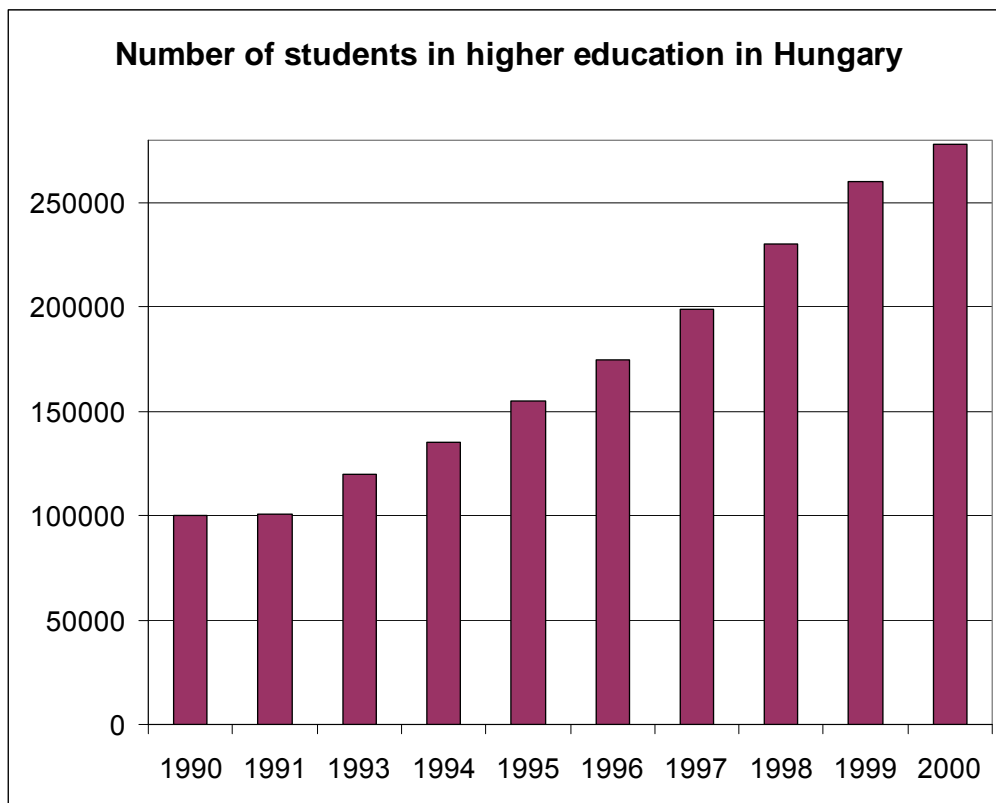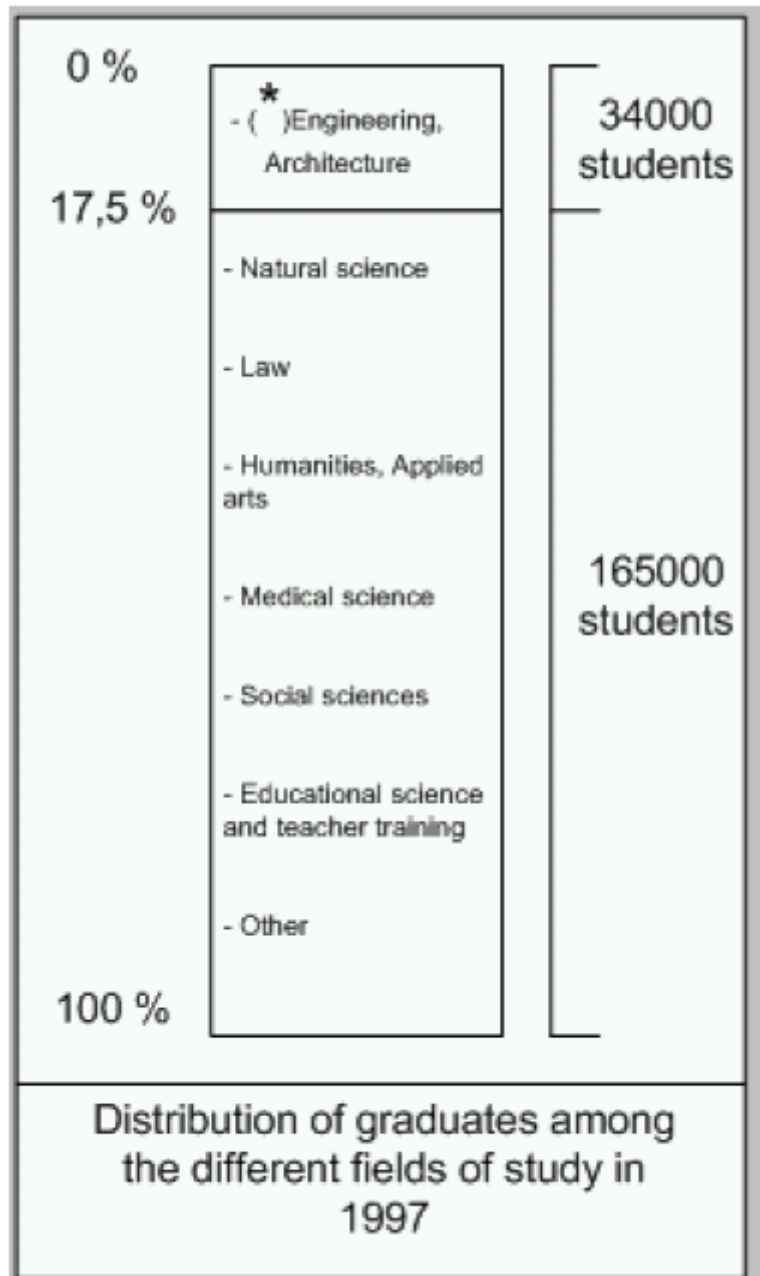

Figure 10.3: Number of students.

Figure 10.4: Weight of EIE.

* There are less than 10 % of students in the field of Electrical and information engineering among the total of students in Engineering and Architecture field.

10.3. Degrees in EIE in Hungary

Curricula at college level (corresponding to B. Sc. level) is a minimum of 3 years (undergraduate courses), maximum 4 years; Education at university level (corresponding to MSc. level) is minimum 4 years, maximum 5 years (graduate programmes). They are higher education institutions able to organise Ph.D. degree (post graduate) but their university professors should have Ph.D. degree and habilitation.

The higher education institutions can organise short-cycled courses in two year called Accredited Higher Vocational Training (AHVT). It is not a degree course, the graduates do not receive a diploma, but a certificate.

The entry to a curriculum requires an entrance exam whose result is combined (in a rather complicated way) with the results of the final examination at the secondary school forming points between 0 and 120. Additional points (up to 5) may be obtained if the applicant has a state-recognized language certificate of a foreign language. A minimum of 60 points must be reached for entry to any institution. The minimum entry requirement to a curriculum at a given institution depends on the number of available places and the quality of the applicants. If the minimum number is set at e.g. 100 it means that all applicants achieving 100 points or more are admitted and all applicants getting 99 or less are rejected. The minimum entry requirement in 2000 is listed after each curriculum to give an idea of its popularity among the students.

Only state-financed full-time curricula are listed which are offered as a first degree. The expression state-financed means that no tuition needs to be paid if a certain result is achieved by the student. Full-time means that the students typically do not have jobs during their studies. First degree means that the student does not yet have any degree from a higher educational institute.

10.3.1 <u>Bachelor level</u>

Degrees offered in *műszaki informatika szak* (technical informatics).

Institution code (min entry points)	No of semesters	No of 1st year students	Official name of institution
BMF-NIK (100)	6	330	Budapesti Műszaki Főiskola NIK
DE-MFK	6	60	Debreceni Egyetem MFK
DF (82)	6	300	Dunaújvárosi Főiskola
GDF (88)	6	400	Gábor Dénes Főiskola
KF-GAMFK (84)	6	324	Kecskeméti Főiskola GAMFK
ME-GÉK (95)	10	100	Miskolci Egyetem GÉK
PTE-PMMFK (82)	6	300	Pécsi Tudományegyetem PMMFK
SZE-MTK (87)	6	280	Széchenyi István Egyetem MTK
VE-MK (82)	6	60	Veszprémi Egyetem MK (Nagykanizsa)

Degrees offered in *programozó matematikus szak* (programming mathematician).

Institution code (min entry points)	No of semesters	No of 1st year students	Official name of institution
DE-TTK (73)	6	50	Debreceni Egyetem TTK
DE-TTK (73)	6	50	Debreceni Egyetem TTK
EKF-TTK (96)	6	40	Eszterházy Károly Főiskola TTK
ME-GÉK (73)	6	40	Miskolci Egyetem GÉK
SZTE-TTK (87)	6	80	Szegedi Tudományegyetem TTK

Degrees offered in *villamosmérnök szak* (electrical engineering).

Institution code (min entry points)	No of semesters	No of 1st year students	Official name of institution
BMF-KVK (77)	6	760	Budapesti Műszaki Főiskola KVK
DE-MFK (85)	6	30	Debreceni Egyetem MFK
ME-GÉK (79)	6	60	Miskolci Egyetem GÉK
PTE-PMMFK (78)	6	105	Pécsi Tudományegyetem PMMFK
SZE-MTK (81)	6	135	Széchenyi István Egyetem MTK
VE-MK (76)	6	65	Veszprémi Egyetem MK
ZMNE-BKMFK (60)	6	70	Zrínyi Miklós Nemzetvédelmi Egyetem BKMFK

10.3.2 *Master level*

Degrees offered in *műszaki informatika szak* (technical informatics).

Institution code (min entry points)	No of semesters	No of 1st year students	Official name of institution
BME-VIK (118)	10	460	Budapesti Műszaki és Gazdaságtudományi Egyetem VIK
PPKE-ITK (100)	10	150	Pázmány Péter Katolikus Egyetem ITK
SZTE-TTK (66)	10	100	Szegedi Tudományegyetem TTK
VE-MK (102)	10	160	Veszprémi Egyetem MK

Degrees offered in *programtervező matematikus szak* (programme designing mathematician).

Institution code (min entry points)	No of semesters	No of 1st year students	Official name of institution
DE TTK (79)	10	100	Debreceni Egyetem TTK
ELTE-TTK (62)	10	400	Eötvös Loránd Tudományegyetem TTK
SZTE-TTK (77)	10	100	Szegedi Tudományegyetem TTK

Degrees offered in *villamosmérnök szak* (electrical engineering).

Institution code (min entry points)	No of semesters	No of 1st year students	Official name of institution
BME-VIK (113)	10	413	Budapesti Műszaki és Gazdaságtudományi Egyetem VIK

10.4. References

The information given in this monograph is based on the following documents and web links: Sima, D.: On the the two-cycle higher education in technology (Gondolatok a kétlépcsős műszaki felsőoktatásról, in Hungarian), © Magyar Akkreditációs Bizottság, 2002,

Source: Felsőoktatási felvételi tájékoztató, Oktatási Minisztérium, 2003. 06. 02.
http://www.mab.hu/doc/bologna.doc

Data regarding entry points etc. http://www.felvi.hu
http://www.om.hu/english
http://www.usc.edu/dept/education/globaled/wwcu/background/Hungary.htm

Doctoral
Studies

10.5. Doctoral Studies in Hungary

10.5.1. Supervision

Scientific Board or Supervisor

University Doctoral Committee with: Head +1-2 members from each faculty +1-2 "external" professors/scientists from the scientific area of each faculty. These external members are not affiliated with the university in question. The members of the Doctoral Committee need to be members of the Hungarian Academy of Science, or university professors, or need to have a DSc degree. The Doctoral Committee members are selected by the University Council. The student, in most cases, has the same personal supervisor during its thesis work on Normally, an active research area of the supervisor.

Subject Assignment

Subject assigned at the beginning of the doctoral studies, by agreement between the student and the supervisor. The Doctoral Committee's acceptance of the thesis subject is necessary.

Who can be a Supervisor

1. In principle anyone with a PhD degree can be a supervisor. Usually a professor of the department, but exceptionally it can also be an external professor or expert with PhD.

2. The Doctoral Committee accepts or rejects the assignment of a supervisor

Tasks of Scientific Board/Supervisor

1.	General management	YES
2.	Deciding/advising layout of course	YES
3.	Assigning a thesis subject	YES

Duration: four years.

10.5.2. Development

Courseware?

Yes.

Course Work

1. The students have to take course work during their doctoral degree preparation. The course work is assessed by examinations and is offered as specialist graduate course units. The student can only start writing the thesis if a specified coursework has been done.

2. Extension: the number of hours may vary. The student should collect a certain amount of credits during the studies.

3. Credit system: ECTS compatible credit system for coursework.

4. Monitoring of the doctoral student. In case of failure the student must retake the exam.

Contribution to Teaching

1. Supervision of undergraduate laboratory work.

2. Teaching of undergraduate students.

Presentation of Work

1. In the department.

2. At national conferences.

3. At international conferences.

10.5.3. Thesis Work

Submission of Doctoral Written Thesis

1.   Language: Hungarian. Alternative languages: English, German or French.

2.   There are credits allocated to the doctoral thesis.

3.   The doctoral thesis is a previously unpublished substantial written report, but it is expected that the main results have been published in at least two referred journal papers.

Oral Presentation of Thesis Work

1.   Language normally used: Hungarian. Alternative languages: English, German or French.

2.   Oral presentation with oral examination for an open/public audience.

3.   Duration: typical duration of 1 hour including examination with no upper time limit.

10.5.4. Examination

Thesis Examination Board

1.   Composition: four-six internal examiners and one-two external examiners (five to seven members).

2.   Selection by the University Doctoral Committee.

Evaluation

1.   Result based on the reading of the thesis and the oral presentation of the thesis work, with a not specified grading system.

2.   Before the oral defence, two examiners read the thesis and support or reject it. If both examiners reject the thesis, the student fails and the doctoral procedure is over. If one supports, one rejects, a third examiner is brought in. If both examiners support the thesis, the oral defence may take place.

10.7. Questionnaires

Hungary

3 – ACTIVITIES DURING DOCTORAL STUDIES

3.1- SUPERVISION OF DOCTORAL STUDIES

3.1.1	Are the doctoral studies supervised by a Scientific Board/supervisor? If no, please proceed to 3.1.5.	YES
3.1.2	**How many members are in the Scientific Board?**	

3.1.3	How are the members of the Scientific Board chosen?	
3.1.3.1	Elected by the Faculty, Department?	Y/N
3.1.3.2	Chosen by the student?	Y/N
3.1.3.3	Chosen in another way? Please specify:	Y/N

The university has a University Doctoral Committee. This Committee comprises the following persons: Head +1-2 members from each faculty +1-2 "external" professors/scientists from the scientific area of each faculty. These external members are not affiliated with the university in question. The members of the Doctoral Committee need to be members of the Hungarian Academy of Science, or university professors, or need to have a DSc degree. The Doctoral Committee members are selected by the University Council.

3.1.4	Which are the main tasks of the Scientific Board/ Supervisor?	
3.1.4.1	General management of the doctoral studies.	Y
3.1.4.2	Deciding the layout of the course, advising the students on their coursework.	Y
3.1.4.4	Assigning the thesis subject.	Y
3.1.4.5	Other. Please specify:	

3.1.5	Does the student need a personal supervisor during her/his studies?	Y
3.1.5.1	Does the same person supervise her/his thesis work?	Y

3.1- SUPERVISION OF DOCTORAL STUDIES

3.1.6   Must the subject of the doctoral thesis be an active research area in the department?   Y/N

Normally yes, but it is also possible that the supervisor is external, i.e. not a full time member of the department.

3.1.7   The doctoral thesis subject is normally assigned:

3.1.7.1   At the beginning of the doctoral studies?   Y

3.1.7.2   After a specified period of coursework?   N

3.1.7.3   Other. Please specify: Y/N

The topic of the thesis is assigned at the beginning of the doctoral studies as the supervisor is an expert of this topic and the supervisor is assigned at the beginning of the doctoral studies. However, the student can only start writing the thesis if a specified coursework has been done.

3.1.8   The thesis supervisor of a doctoral student can be:

3.1.8.1   Any professor or lecturer in the department?   Y/N

3.1.8.2   Any researcher in the department?   Y/N

3.1.8.2.1   In this case, is there a need for a second supervisor who is a professor or lecturer in the department?

In principle anyone with a PhD degree can be a supervisor. Usually, this is a professor of the department, but exceptionally it can also be an external professor or expert as well (with a PhD of course). The Doctoral Committee accepts or rejects the assignment of a supervisor.

3.1.8.3   Any researcher in another institution?   Y/N

3.1.8.3.1   In the latter case, is there a need for an internal supervisor?   Y/N

See above.

3.1.8.4   Other methods. Please specify: Y

3.1- SUPERVISION OF DOCTORAL STUDIES

3.1.9   The thesis subject is assigned by:

3.1.9.1   Agreement between the student and the proposed supervisor?

Y

3.1.9.2   Other methods. Please specify:

Y/N

The Doctoral Committee's acceptance of the thesis subject is necessary.

3.2- COURSE WORK

3.2.1   Do the students have to take coursework during their doctoral degree preparation? If no, please proceed to 3.3.

Y

3.2.2   **Extension and assessment.**

3.2.2.1   What is the number of contact hours spent in coursework in each year?

Year 1	**Year 2**	**Year 3**	**Year 4**
30 hrs	**15 hrs**	**hrs**	**hrs**

The number of contact hours may vary. It is expected, however, that the student should collect a certain amount of credits during the studies.

3.2.2.2   **In which form is this coursework offered?**

- **As specialist graduate course units**.

- As course units taken from the undergraduate programme.

- Other. Please specify.

3.2.2.3   Is the coursework assessed by examinations?
If not, please give details:

y

3.2.3   **Credit system**

3.2.3.1   Is the coursework in your institution described by a credit system?

y

3.2.3.2   Is it the ECTS system?

Y/N

If not, what is the relationship with ECTS?

It is not ECTS, but it is compatible.

3.2- COURSE WORK

3.2.3.3   How many credits are allocated to coursework?

        __ credits

This varies from university to university. Not only coursework can yield credits, but also undergraduate teaching assignments, publications etc. The computation of credits is a very complicated procedure.

3.2.4   **Monitoring**

3.2.4.1   Do you monitor the performance of the doctoral student taking coursework?   y

3.2.4.2   **What regulations apply in case of failure in one or more course units?**

    - **Retake the exam**.

    - Take a different course unit.

3.3- PRESENTATION OF WORK RESULTS:

3.3.1   In the department.

3.3.2   At national conferences.

3.3.3   At international conferences.

All of these are expected.

3.4- CONTRIBUTION TO TEACHING:

3.4.1   Supervision of undergraduate laboratory.

3.4.2   Teaching undergraduate courses.

All of these are expected.

4 - AWARDING OF DOCTORAL DEGREE

4.1- SUBMISSION OF DOCTORAL THESIS

4.1.1	Which language is normally used for the thesis?	Hungarian

4.1.2	Are alternative languages used for the thesis? Please Specify:	Y/N

The student is allowed to write the thesis in European languages, Typically English, German or French. This normally happens if it is a foreign student, but it may happen with a Hungarian student as well.

4.1.3	Which language is normally used for the oral presentation and/or examination?	Hungarian
4.1.4	Are alternative languages used in the oral presentation and examination? Please Specify:	YES/NO

See 4.1.2..

4.1.5	Are credits allocated to the doctoral thesis?	Y

4.1.6 **The doctoral thesis is:**

4.1.6.1 A previously unpublished substantial written report.

4.1.6.2 A collection of individual or co-authored scientific papers with an introduction and/or commentary.

4.1.6.3 Other. Please specify:

A combination of the above. The thesis has to be a scientific report, previously unpublished, but it is expected that the main results have been published in at least two refereed journal papers. This is difficult for some students.

4.2- THESIS EXAMINATION AND DEGREE AWARDING

4.2.1	Is there an oral presentation of the thesis work for an open audience as part of the evaluation procedure?	YES

4.2.2 Composition of the thesis examination board. Please, give the typical number of:

4.2.2.1	Internal examiners.	4-6
4.2.2.2	External examiners.	1-2
4.2.2.3	TOTAL.	5-7

4.2- THESIS EXAMINATION AND DEGREE AWARDING

4.2.3   How is the examination board chosen?

The Board is appointed by the Doctoral Committee.

4.2.3.1   By the supervisor.

4.2.3.2   By the scientific committee of the institution.

4.2.3.3   By the rector or equivalent.

4.2.3.4   By the national ministry.

4.2.3.5   Other. Please specify:

4.2.4   Do the examiners base their evaluation mark on:

4.2.4.1   Reading the thesis.

Y/N

4.2.4.2   The oral presentation of the thesis work.

Y/N

4.2.4.3   **Both**.

4.2.4.4   What is the typical duration of the oral part of the thesis examination, if applicable?

1 hour

4.2.4.5   Is there an upper limit to the duration of the thesis examination?

N

4.2.5   Is the oral part of the examination taken behind closed doors?

N

The examination, i.e. "Defence of the thesis" is open to the public.

4.2.6   What happens if the student fails?

4.2.6.1   May not resubmit for doctorate.

Y/N

4.2.6.2   May resubmit revised thesis.

Y/N

4.2.6.3   May do further work as specified by examination board.

Y/N

4.2.6.4   If the thesis is to be re-submitted is there a time limit for this to occur? Please specify:

Y/N

Before the oral defence, two examiners read the thesis and support or reject it. If both examiners reject the thesis, the student fails and the doctoral procedure is over. If one supports, one rejects, a third examiner is brought in. If both examiners support the thesis, the oral defence may take place.

4.2- THESIS EXAMINATION AND DEGREE AWARDING

4.2.7   Is there a grading system for the doctoral degree based on the quality of the work?   Y

HU: Magyarország (Hungary)

State Universities

City	Hungarian name	English name	Legend	http address
Budapest	Budapesti Mûszaki és Gazdaságtudományi Egyetem	Budapest University of Technology and Economics	BME	http://www.bme.hu/en/organization/faculties/electrical/index.html
Budapest	Eötvös Loránd Tudományegyetem	Eötvös Loránd University	ELTE (ELTE-TTK)	http://teo.elte.hu/fs/
Debrecen	Debreceni Egyetem	University of Debrecen	DE (DE-MFK/TTK)	http://www.klte.hu/eng.htm
Miskolc	Miskolci Egyetem	University of Miskolc	ME (ME-GÉK)	http://www.uni-miskolc.hu/e_index.php
Pécs	Pécsi Tudományegyetem	University of Pécs	PTE (PTE-PMMFK)	http://www.ki.pte.hu/eng/
Sopron	Nyugat-Magyarországi Egyetem	University of Sopron	NYME	http://www.nyme.hu/
Veszprém	Veszprémi Egyetem	University of Veszprém	VE (VE-MK)	http://www.vein.hu/other_lang/english/english.html

Colleges

City	Hungarian name	English name	Legend	http address
Budapest	Budapesti Műszaki Főiskola	Budapest Polytechnic	BMF	http://www.bmf.hu/
Budapest	Gábor Dénes Főiskola	Gábor Dénes college	GDF	http://www.gdf-ri.hu/
Budapest	Semmelweis Egyetem	Semmelweis University	SE	http://www.sote.hu/
Budapest	Zrinyi Miklos Nemzetvedelmi Egyetem		ZMNE-BKMFK	http://www.zmne.hu/
Dunaújváros	Dunaújvárosi Főiskola		DF	http://www.poliod.hu/
Eger Eszterházy	Eszterházy Karoly Főiskola	Eszterházy Karoly College	EKF-TTK	http://www.ektf.hu/index.php
Gödöllõ	Szent István Egyetem	Szent István University	SZIE	http://www.szie.hu/
Kaposvár	Kaposvári Egyetem	University of Kaposvár	KE	http://www.kaposvar.pate.hu/
Kecskemét	Kecskeméti Főiskolán		KF-GAMFK	http://www.gamf.hu/
Gyõr	Széchenyi István Egyetem	Széchenyi István University	SZE-MTK	http://www.sze.hu/
Szeged	Szegedi Tudományegyetem	University of Szeged	SZTE	http://www.inf.u-szeged.hu