

22. SK: Slovensko (Slovak Republic)

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22.1. General information



According to the new HE (Higher Education) law there are public (20), state (3) and private (10) HE institutions in Slovakia. Only 4 public HE institutions offer education in EIE. These are - Slovak University of Technology Bratislava (Faculty of Electrical Engineering and Information Technology, Faculty of Informatics and Information Technologies), Alexander Dubček University in Trenčín (Faculty of Mechatronics), University of Žilina (Faculty of Electrical Engineering, Faculty of Management Science and Informatics), and Technical University of Košice (Faculty of Electrical Engineering and Information Technology).

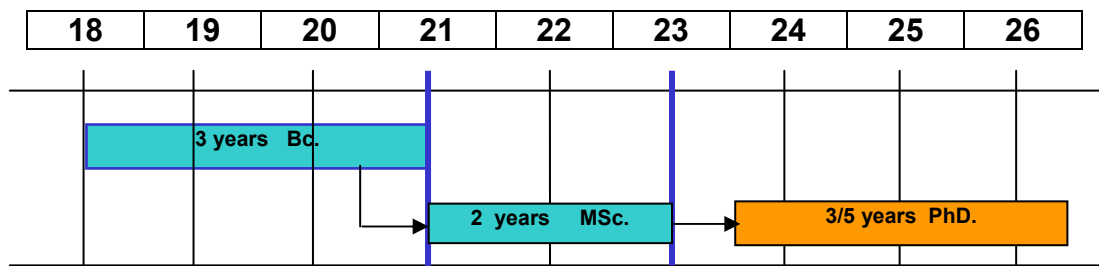


Figure 22.1: Simplified Scheme of Slovakian Higher Education System in EIE disciplines

All study programs provided by the HE institutions have to be approved by the Scientific Board of the HE institution and accredited by the Accreditation Commission, which

is a body established by the government. Accreditation of the programme should guarantee that certain minimum quality criteria of the education provided are obeyed.

Higher education institutions provide the study programmes at three levels:

The Bachelor's study programme which according to the HE law can take three years at least and four years at most. But really the standard length of first cycle study program is 3 years.

The Magister's, Engineer's (equivalent to MSc.) and Doctor's (RNDr.) study programmes. In EIE there are only Engineer's (MSc.) programs. The study takes one year at least and three years at most so that the standard length of study according to the Bachelor's study programme and the continuing second level study programme in the same or relative main field of study is in total five years at least.

The PhD. study programme. The standard length in full-time form is three years at least.

The general condition for admission to the first-degree program is secondary school-leaving certificate (vysvedčenie o maturitnej skúške) issued after passing the secondary school-leaving examination taken upon completing 13, exceptionally, 12 years of study.

The school-leaving certificates are issued by the following types of secondary schools:

gymnasium – the study takes 4 or 8 years depending on the grade of the basic school it follows,

specialized secondary school – 4 or 5 years of study,

vocational secondary school – only the certificates issued after 4 or 5 years of study,

Higher education institutions organise as a rule the admission examination.

The general condition for the admission to the second-degree program is the successful completion of the first-degree programme in the same main field of study (specialization) or a related one and the successful completion of the programme entrance examination.

The general condition for the admission to the PhD. programme is the successful completion of an appropriate second-degree programme and the completion of the programme entrance examination.

The education in the area of EIE at the level of "technicians" is briefly described in section 11.2.2.

Electrical and Information Engineering in Slovakia, boundaries of the field of study

According to the new HE law (No. 131/2002) passed in February 2002, study programmes in the academic year 2007/8, are based on a new “system of study fields in HE” issued by the Ministry of Education of the Slovak Republic in December 2002 [see <http://www.minedu.sk/index.php?lang=sk&rootId=413>]. Following this document the study programs in EIE at the level of the first degree (Bc.), the second degree (MSc.) and the third degree (PhD.) are based on the “main fields of study” as defined by the document “Sústava študijných odborov Slovenskej republiky” (The System of Main Fields of Study of the Slovak Republic [see: http://www.minedu.sk/data/USERDATA/VysokeSkolstvo/SSOSR/Sustava_studijnych_odborov_SR.xls]),

issued by the Ministry of Education of the SR in 2002. Each “Study Program” has to be designed and realized in the frame of the particular “Main field of study” which is described in the above mentioned document. Several programmes can be designed and realized in the same field of study focusing its contents on some closer specialization but containing necessary “core knowledge” of the main field. The EIE relevant main fields of study can be seen in the table shown below.

Doctorate	Master	Bachelor	Level of the Degree
X			Electrical Engineering
X	X	X	Electrical Power Engineering
	X	X	Power Electrical Devices
X			Nuclear Power Engineering
X	X	X	Theoretical Electromagnetic Engineering
	X	X	Physical Engineering
X			Physics of Condensed Matter and Acoustics
X	X	X	Material Science and Electrotechnology
	X	X	Applied Informatics & Automation
X			Automation
X	X	X	Automation and Measurement
	X	X	Cybernetics
X			Mechatronics
X	X	X	Electronics
	X	X	Instrumentation
X			Metrology
X	X	X	Telecommunications
	X	X	Computer Engineering
X			Software Engineering
X	X	X	Applied Informatics

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	X	X	Applied Informatics & Automation
X			Artificial Intelligence
X	X	X	Information Systems
	X	X	Applied mathematics
X			Business Informatics

Content, degrees and accreditation

The curricula of all HE study programs are designed by the professors who are employed at the particular HE institutions that will offer the programme, in cooperation with the professionals from the industry at home and from abroad. The process of the curricula design takes into account the internal HE institution quality assurance criteria. The final version of the program has to be approved by the Scientific Board of the HE institution and is also discussed in the HE institution Academic Senate. After that the program has to be accredited by the Accreditation Commission that is the advisory body of the Slovak Government.

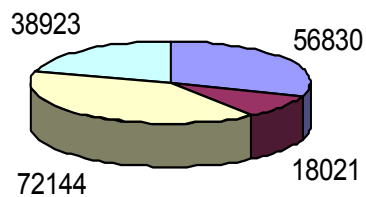
Implementation of the Bologna-BMD system in Slovakia

In February 2002 new HE law was accepted by the Parliament and a few of new amendments were accepted later. All substantial features of the Bologna mainframes were built into the new law. It concerns mainly the implantation of the three cycle system of study [Bc., Mgr. or Ing. and PhD.], the implementation of the ECTS, the limits of length of the first and second cycle of the HE programs and the doctoral programs (PhD.). Generally one can state that the scheme Bologna-BMD in Slovakia has been legally accepted and is already introduced into practical life.

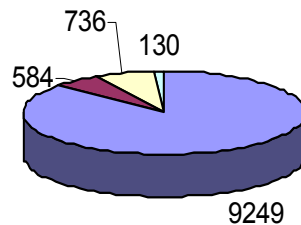
22.2. Figures on the weight of EIE in Slovakia

Statistical figures concerning the 1-st and 2-nd cycles study programs at Slovak HE institutions in the field of EIE – academic year 2006/2007			
Total number of students:		13711	
In daily study: 11724		In external study: 1987	
Man:	Woman:	Man:	Woman:
10367	1357	1365	624
Total numbers of new admitted students into the 1-st and 2-nd cycles study programs:			
Daily study: 4203		External study: 932	
Total numbers of graduates from the 1-st and 2-nd cycles study programs:			
Daily study: 1697		External study: 135	
Man:	Woman:	Man:	Woman:
1541	156	113	22

**The total numbers of students in Slovak HE
as to October 30, 2007**



**The total numbers of students in Slovak HE
engaged in EIE as to October 30,2007**



22.3. Degrees in EIE in Slovakia

Higher education institutions engaged in EIE award the following academic degrees:

1st level
bakalár (Bc. - bachelor)

2nd level
inžinier (Ing. - Engineer)

3rd level
philosophiae doctor (PhD.)

Technician program

The education in the area of EIE at the level of “technicians” is provided by the special industrially oriented secondary grammar schools (*Stredna priemyselna skola*). The nominal duration of the program at these schools are 4 years. The programme is completed by the “School-leaving examination” (*Maturita*). After the

program completion the students look for a job (can be added "as a technician") or can apply for admission to the university program.

There is also another possibility to obtain the technical education at the level of "technician" - the "Vocational Schools" (*Stredne odborné ucilistia* – Apprentice Professional Schools) with the nominal program duration of 3 years. After the program completion one can go for a job or continue in the program for another two years (that is a total of 5 years) and complete the program by the "School-leaving examination" (*Maturita*). These people can then apply for the admission to the university program."

22.4. References

The information given in this monograph is based on the following documents and weblinks:

<http://www.fej.stuba.sk>

<http://www.fiiit.stuba.sk>

<http://www.tnuni.sk>

<http://www.uniza.sk>

<http://www.tuke.sk>

<http://www.minedu.sk>

<http://www.uips.sk>

<http://www.minedu.sk/index.php?lang=sk&rootId=413>

List of “Study programs” and corresponding “Main Fields of Study” in EIE offered by Slovak Technical Universities

University/Faculty:	Cycle:	Name of the “Study Program”:	Name of the corresponding “Main Field of Study”:
Slovak University of Technology in Bratislava Faculty of Electrical Engineering and Information Technology	1. (Bc.)	Electrical Engineering	Electrical Engineering
		Electronics	Electronics
		Telecommunications	Telecommunications
		Industrial Informatics	Applied Informatics & Automation
		Applied Informatics	Applied Informatics
		Automobile Electronics	Electrical Engineering
	2. (Ms.)	Robotika, Robotics	Automation
		Measurement and Information Technology	Automation and Measurement
		Cybernetics	Cybernetics
		Electrical Power Engineering	Electrical Engineering
		Radioelectronics	Electronics
		Microelectronics	Electronics
		Telecommunications	Telecommunications
		Physical Engineering	Physical Engineering
	3. (PhD.)	Applied Informatics	Applied Informatics
		Physics of Condensed Matter and Acoustics	Physics of Condensed Matter and Acoustics
		Applied Mechanics	Applied Mechanics
		Theoretical Electromagnetic Engineering	Theoretical Electromagnetic Engineering
		Power Electrical Devices	Power Electrical Devices
		Material Science and Electrotechnology	Material Science and Electrotechnology
		Radioelectronics	Electronics
		Microelectronics	Electronics
		Automation and Control	Automation
		Telecommunications	Telecommunications
		Mechatronics	Mechatronics
		Electrical Power Engineering	Electrical Power Engineering
		Nuclear Power Engineering	Nuclear Power Engineering
		Instrumentation	Instrumentation
		Metrology	Metrology
	Physical Engineering	Physical Engineering	
	Applied mathematics	Applied mathematics	
	Cybernetics	Cybernetics	

Slovak University of Technology in Bratislava Faculty of Informatics and Information Technologies	1. (Bc.)	Informatics	Informatics
		Computer Systems and Networks	Computer Engineering
	2. (Ms.)	Computer Systems and Networks	Computer Engineering
		Software Engineering	Software Engineering
		Information Systems	Information Systems
	3. (PhD.)	Computer Systems and Networks	Computer Engineering
		Software Systems	Software Engineering
		Artificial Intelligence	Artificial Intelligence

Trenčín University of Alexander Dubček in Trenčín Faculty of Mechatronics	1. (Bc.)	Management of Production Quality	Business Informatics
		Mechatronics	Mechatronics
		Mechatronics of motorway vehicles	Mechatronics
	2. (Ms.)	Management of Production Quality	Business Informatics
		Mechatronics	Mechatronics
	3. (PhD.)	Mechatronics	Mechatronics

University of Žilina Faculty of Electrical Engineering	1. (Bc.)	Automobile electrotechnics	Electrical Engineering
		Electrical Engineering	Electrical Engineering
		Komerčná elektrotechnika	Electrical Engineering
		Elektrotechnické systémy v mechatronike. Electrical Systems in Mechatronics	Mechatronics
		Telekomunikácie, Telecommunications	Telecommunications
		Multimedia Technologies	Electronics
		Safety Control Engineering	Automation
		Biomedical Engineering	Theoretical Electromagnetic Engineering
	2. (Ms.)	Electric Traction	Power Electrical Devices
		Electric Drives	Power Electrical Devices
		Electric Power Systems	Electrical Power Engineering
		Power Electronics	Power Electrical Devices
		Electrical Systems in Mechatronics	Mechatronics
		Telecommunication and Radiocommunication Engineering	Telecommunications
		Safety Control Engineering in Transport	Automation
		Safety Control Engineering in Industry	Automatiation
		Biomedical Engineering	Theoretical electromagnetics
		Physical Engineering	Physical Engineering

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	3. (PhD.)	Power Electrical Devices	Power Electrical Devices
		Telecommunications	Telecommunications
		Theoretical Electromagnetic Engineering	Theoretical Electromagnetic Engineering

University of Žilina Faculty of Management Science and Informatics	1. (Bc.)	Informatics	Informatics
		Management	Business Informatics
		Computer Engineering	Computer Engineering
	2. (Ms.)	Information Systems	informatics
		Information management	Business Informatics
		Economy Information	Business Informatics
		Computer Engineering	Computer Engineering
	3. (PhD.)	Management	Business Informatics
		Control and Management of Transportation Systems	Automation
		Applied Informatics	Applied Informatics

Technical University in Košice Faculty of Electrical Engineering and Information Technology	1. (Bc.)	Automobile electronics	Electronics
		Managing Systems in Power Engineering	Electrical Engineering
		Electrical Power Engineering	Electrical Engineering
		Electrical Power Engineering in Environment	Electrical Engineering
		Elektronika	Electronics
		Electrical Engineering	Electrical Engineering
		Smart Systems	Cybernetics
		Aplikovaná informatika	Applied Informatics
		Počítačové modelovanie	Applied Informatics
		Information Systems in Mechatronics	Mechatronics
		Informatics	Informatics
		Engineering of Industry Control	Industrial Engineering
		Kybernetika	Cybernetics (main) and Automation (Subsidiary)
		Telekomunikácie	Telecommunications
		Automobilová mechatronika	Mechatronics
		Fyzikálne inžinierstvo moderných materiálov	Physical Engineering
		Hospodárska informatik	Business Informatics
	2. (Ms.)	Automation	Automation
		Electrical Power Engineering	Electrical Engineering
		Electronic Measurement	Measurement
		Electrical Engineering	Electrical Engineering
		Information Electronics	Electronics
		Informatics	Informatics
		Industry Control Engineering	Industrial Engineering
		Cybernetics	Cybernetics
Multimedia Telecommunications	Telecommunications		
Computer Engineering	Computer Engineering		

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		Production Technologies in Electronics	Electronics	
		Artificial Intelligence	Artificial Intelligence	
		Physical Engineering of Modern Materials	Physical Engineering	
		Economy Informatics	Business Informatics	
	3. (PhD.)		Automation	Automation
			Electrical Power Engineering	Electrical Power Engineering
			Electrical Engineering Systems	Power Electrical Devices
			Material Science and Electrotechnology	Material Science and Electrotechnology
			Information Electronics	Electronics
			Informatika	Informatics
			Cybernetics	Cybernetics
			Instrumentation	Instrumentation
			Telecommunications	Telecommunications
			Artificial Intelligence	Artificial Intelligence



22.5. Doctoral Studies in the Slovak Republic

22.5.1. Supervision

Scientific Board or Supervisor

The Scientific board is composed by twenty four members chosen by the Dean of the Faculty. Then the Scientific Board must be approved by the Academic Senate. The student, in most cases, has the same personal supervisor during its thesis work on an active research area of the supervisor.

Subject Assignment

The subject is assigned at the beginning of the doctoral studies. Thesis subjects are proposed by the eligible supervisors and published; students interested in doctoral studies can choose one subject before they apply for admission. The title of the thesis work can be modified but not later then after the third semester.

Who can be a Supervisor

Only persons having rank of full professor and associated professor are eligible to serve as a supervisor without further conditions.

Tasks of Scientific Board/Supervisor

- | | | |
|----|------------------------------------|-----|
| 1. | General management | YES |
| 2. | Deciding/advising layout of course | NO |
| 3. | Assigning a thesis subject | NO |

The documentation needed for the accreditation of the PhD study programmes (by the Accreditation Commission) has to be approved by Scientific Board of the Faculty.

Duration

Three years.

22.5.2. Development

Courseware?

Yes.

Course Work

1. The students have to take course work during their doctoral degree preparation and offered as specialist graduate course units. With exception of lectures that form of special seminars and special laboratory exercises, the course work is assessed by examinations. If the student fails in the course work, he/she must retake the exam in the case of an obligatory course unit or in the case of optional one it is possible to take a different course unit.
2. Extension: 480 hours in the first year.
3. Credit system: ECTS. Forty credits are allocated to course work.
4. Monitoring of the doctoral student when the course work is assessed by examinations.

Contribution to Teaching

1. Supervision of undergraduate laboratory work.
2. Coaching of master thesis work.

Presentation of Work

1. In the department.
2. At national conferences.
3. At international conferences.

22.5.3. Thesis Work

Submission of Doctoral Written Thesis

1. Languages Slovak. Alternative languages: English and German.
2. Credits are allocated to the doctoral thesis.
3. The doctoral thesis is a previously unpublished substantial written report, or a collection of individual or co-authored scientific papers with an introduction and/or commentary.

Oral Presentation of Thesis Work

1. Languages Slovak. Alternative languages: English and German.
2. Oral presentation with oral examination for an open audience.
3. Duration: typical duration of 1 hour to 2 hours including examination. There is no upper time limit, but it does not take more than 2 hours. The chairman of the examination commission has the right to stop the student if necessary.

22.5.4. Examination

Thesis Examination Board

1. Composition: four internal examiners and four external examiners in a total of eight members. In the Dutch part of the country there is also an independent chairman.
2. Selection: the examination board is chosen by the person responsible for the general organization of studies in a given study field; the board must be then approved by the dean.

Evaluation

1. Result based on the reading of the thesis and the oral presentation of the thesis work, with two possible final decisions: "Completed" or "Not completed".
2. If the student fails, he/she may resubmit a revised thesis within a time limit or do further work as specified by the examination board.

22.6. Questionnaires

Slovak Republic

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?	24
3.1.3	How are the members of the Scientific Board chosen?	
3.1.3.1	Elected by the Faculty, Department?	N
3.1.3.2	Chosen by the student?	N
3.1.3.3	Chosen in another way? Please specify:	Y
	Members of the Scientific Board are chosen by the Dean of the Faculty, and then the Scientific Board must be approved by the Academic Senate.	
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.	N
3.1.4.4	Assigning the thesis subject.	N
3.1.4.5	Other. Please specify:	
	The documentation needed for the accreditation of the PhD study programmes (by the Accreditation Commission) has to be approved by Scientific Board of the Faculty.	
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
3.1.6	Must the subject of the doctoral thesis be an active research area in the department?	Y

3.1- SUPERVISION OF DOCTORAL STUDIES

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

The title of the thesis work can be modified but not later then after the third semester.

3.1.8 The thesis supervisor of a doctoral student can be:

- 3.1.8.1 Any professor or associated professor (docent) in the department? N
- 3.1.8.2 Any researcher in the department? 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?
- 3.1.8.3 Any researcher in another institution? N
- 3.1.8.3.1 In the latter case, is there a need for an internal supervisor? N
- 3.1.8.4 Other methods. Please specify: Y

Only persons having rank of full professor and associated professor are eligible to serve as a supervisor without further conditions.

3.1.9 The thesis subject is assigned by:

- 3.1.9.1 Agreement between the student and the proposed supervisor? N
- 3.1.9.2 Other methods. Please specify: Y

Thesis subjects are proposed by the eligible supervisors and published; students interested in doctoral studies can choose one subject before they apply for admission.

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
		480	0	0	Does not exist

3.2- COURSE WORK

3.2.2.2 In which form is this coursework offered?

- As specialist graduate course units. Y

- As course units taken from the undergraduate programme.

- Other. Please specify.

Except the lectures we use also the form of special seminars and special laboratory exercises.

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

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

If not, what is the relationship with ECTS?

3.2.3 Credit system

3.2.3.3 How many credits are allocated to coursework? 40

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. Y¹

- Take a different course unit. Y¹

¹ Retake the exam in the case of an obligatory course unit or in the case of optional one it is possible to take a different course unit.

3.3- PRESENTATION OF WORK RESULTS:

3.3.1 In the department. Y

3.3.2 At national conferences. Y

3.3.3 At international conferences. Y

3.4- CONTRIBUTION TO TEACHING:

3.4.1 Supervision of undergraduate laboratory. Y

3.4.2 Teaching undergraduate courses. Y

4 - AWARDING OF DOCTORAL DEGREE

4.1- SUBMISSION OF DOCTORAL THESIS

4.1.1	Which language is normally used for the thesis?	Slovak
4.1.2	Are alternative languages used for the thesis? Please Specify: English(German)	Y
4.1.3	Which language is normally used for the oral presentation and/or examination?	Slovak
4.1.4	Are alternative languages used in the oral presentation and examination? Please Specify: English (German)	YES
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.	Y
4.1.6.2	A collection of individual or co-authored scientific papers with an introduction and/or commentary.	Y (may be)
4.1.6.3	Other. Please specify:	

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?	Y
4.2.2	Composition of the thesis examination board. Please, give the typical number of:	
4.2.2.1	Internal examiners.	4
4.2.2.2	External examiners.	4
4.2.2.3	TOTAL.	8

4.2- THESIS EXAMINATION AND DEGREE AWARDING

4.2.3	How is the examination board chosen?	
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:	Y
	The examination board is chosen by the person responsible for general organization of studies in a given study field, the board must be then approved by the dean.	
4.2.4	Do the examiners base their evaluation mark on:	
4.2.4.1	Reading the thesis.	Y
4.2.4.2	The oral presentation of the thesis work.	Y
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
	But it does not take more than 2 hours. The chairman of the examination commission has the right to stop the student if necessary.	
4.2.5	Is the oral part of the examination taken behind closed doors?	N
4.2.6	What happens if the student fails?	
4.2.6.1	May not resubmit for doctorate.	N
4.2.6.2	May resubmit revised thesis.	Y
4.2.6.3	May do further work as specified by examination board.	Y
4.2.6.4	If the thesis is to be re-submitted is there a time limit for this to occur? Please specify:	Y
	The Examination Commission decides about the extent of thesis revision and determines new date for exam.	

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? N

Only one of two possible final decisions: "Completed" or "Not completed".

SK: Slovensko (Slovak rep.)

City	Institution (Slovak)	Institution (English)	http address
Bratislava	Slovenská technická univerzita Bratislava	Slovak University of Technology Bratislava	http://www..stuba.sk
Trenčín	Trenčianska univerzita Alexandra Dubčeka v Trenčíne	Alexander Dubček University in Trenčín	http://www.tnuni.sk
Žilina	Žilinská univerzita v Žiline	University of Žilina	http://www.uniza.sk
Košice	Technická univerzita Košice	Technical University of Košice	http://www.tuke.sk