

There are 6 higher education institutions in the field of EIE; all of them are public university type institutions. Public institutions are financed by the state budget by the Ministry of Education, Youth and Sports. The private higher education institutions could be partially financed by the state. In addition, the Czech higher education system includes 4 state higher education institutions. There are three military higher education institutions and a police academy. These institutions are financed by the Ministry of Defence and the Ministry of the Interior. All higher education institutions provide accredited study programmes which are assessed by the Accreditation Commission.

There are three university level studies:

- **Bachelor studies** (*Bc.* = "*Bakalář*"):

The standard length of study including practical training is at least three years and at most four years. According to the Higher Education Act there is no difference between bachelor studies at university and non-university type institutions. The bachelor study programmes cover all main disciplines, except in medicine, veterinary medicine, pharmacy, architecture and law. It is conceived either as an independent course whose graduates are fully qualified for particular professions or as the first stage of longer studies whose graduates can continue towards the *magistr* degree. This cycle leads to the academic degree of "*Bakalář*" (*Bc.*) or "*Bakalář umění*" (*BcA.*) in the field of arts which was introduced in January 1999. Students must sit for a final state examination, part of which is also the defence of the bachelor thesis.

- **Master studies** (*Mgr.* = "*Magistr*"):

The standard length of study is at least four and at most six years. Master study programmes may represent a continuation of bachelor study programmes; should this be the case, the standard length of study is at least two and at most three years. The master study programmes in the humanities, education and social sciences, natural sciences, pharmacy, theology, law and art last for five years and lead to the title of "*Magistr*" (*Mgr.*). In economics, agriculture and chemistry, studies last for five years and lead to the academic degree of "*Inženýr*" (*Ing.*). In engineering, studies last between five and five-and-a-half years and also lead to the degree of "*Inženýr*" (*Ing.*). In architecture, veterinary medicine and medicine, studies last for six years. Graduates in medicine obtain the degree of "*Doktor medicíny*" (*MUDr*) and of "*Doktor veterinární medicíny*" (*MVDr*) in veterinary medicine. According to the 1998 Act, graduates of master programmes in architecture are awarded the title of "*Inženýr architekt*" (*ing. arch.*) and graduates in the arts the academic degree of "*Magistr umění*" (*MgA*). The new Act enables holders of the title of *magistr* to sit for a state examination in the same field and defend a dissertation to acquire the academic degree of *Doktor* followed by the name of the field "*Doktor práv*" (*JUDr*), "*Doktor filosofie*" (*PhDr*), "*Doktor přírodních věd*" (*RNDr*), "*Doktor farmacie*" (*Phar.Dr.*) and "*Doktor teologie*" (*ThDr*).

• **Doctoral studies** (*Dr. = "Doktor"*):

The standard length of study is three years. The third and highest level of higher education consists in studies for the doctorate which take place under the guidance of a tutor. The programme is aimed at scientific research and independent study. Holders of the master's degree may apply. Studies last for three years (four to five years part-time) and lead to the academic degree of "*Doktor*" (PhD) or "*Doktor teologie*" (Th.D.) in the field of theology. Studies end with the state doctorate examination and the defence of a dissertation.

3.1.1 Electrical and Information Engineering in Czech Republic, boundaries of the field of study

EIE in the Czech Republic covers the whole spectrum of electrical and information disciplines, i.e. instrumentation and measurement, control systems, robotics and automation, telecommunications, dielectrics and insulation, antennas and propagation, engineering in medicine and biology, power engineering, power electronics as well as information engineering. There is usually one common faculty for both electrical and information engineering, since 2002 there has been a special faculty for information engineering at Brno University of Technology and it is probable that the same will happen at the other universities.

3.1.2 Content, degrees and accreditations

Pedagogical content is proposed by each university. The proposal must be approved by the Ministry of Education; still there is no common programme at national level.

3.1.3 Implementation of the Bologna-BMD system in Czech Republic

The Bologna-BMD system has been implemented since the school year 2002/2003 at the following institutions:

- Faculty of Electrical Engineering and Communication and the Faculty of Information Technology of Brno University of Technology
- Faculty of Informatics of the Masaryk University Brno,
- Faculty of Electrical Engineering of the University of West Bohemia in Pilsen
- Faculty of Electrical Engineering of Czech Technical University in Prague

It will be implemented at the Faculty of Electrical Engineering and Informatics of the Technical University of Ostrava in the school year 2003/2004. The Department of Informatics of the University of Pardubice provides only bachelor level studies.

3.2. Figures on the weight of EIE in the Czech Republic

All the data below concerns the school year 2001-2002. Detailed data for technical disciplines is available only for bachelor and master study level.

The total number of students in higher education institutions: 238 578

Bachelor and master studies

Total number of students: 219 514

Number of students in technical disciplines: 54 421

Number of students in EIE disciplines: 11 875

Total number of graduates: 28 657

Number of graduates in technical disciplines: 6279

Number of graduates in EIE disciplines: 1445

Doctoral studies

Total number of students: 19 064

Total number of graduates: 1 062

3.3. Degrees in EIE in the Czech Republic

- Bachelor (Bakalář – Bc.): three years of higher education studies after the end of secondary school.
- Master (Inženýr – Ing.): five years of university studies after the end of secondary school or – when the Bologna-BMD model is applied – two years of university studies after the end bachelor studies.
- Doctor (Doktor – Ph.D.): three years of university studies after the end of master studies.

3.3.1 Bachelor level

Standard length of studies is six semesters, which represents 180 credits (ECTS) with the following average distribution of subjects:

- Fundamentals (mathematics, physics etc.): 35 %
- Computer and information systems: 15 %
- Specialized courses in a given EIE field: 40 %
- Languages (mainly English and German): 5 %
- Projects: 5 %

3.3.2 *Master level*

Standard length of studies is four semesters (358 model), which represents 120 credits (ECTS) with the following average distribution of subjects:

- Fundamentals (mathematics, physics, etc.): 7 %.
- Computer and information systems: 14 %.
- Specialized courses in a given EIE field: 60 %.
- Languages (mainly English and German): 7 %.
- Projects: 12 %.

3.4. References

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

- <http://www.msmt.cz/> (Ministry of Education, Youth and Sports)
- <http://www.msmt.cz/Files/vysokeskoly/Legislativa/HigherEduAct.htm>
(Higher Education Act)
- <http://www.csvs.cz/en/> (Centre for Higher Education Studies)
- <http://www.czso.cz> (Czech Statistical Office)



Doctoral

Studies

3.5. Doctoral Studies in the Czech Republic

3.5.1. Supervision

Scientific Board or Supervisor

The Scientific board is composed by 32 members elected by the Department. The student, in most cases, has the same personal supervisor during its thesis work on an active research area of the supervisor.

Subject Assignment

Students interested in doctoral studies choose one subject before they apply for admission, by agreement between the student and the supervisor.

Who can be a Supervisor

1. Only persons having rank of professor and assistant professor are eligible to serve as supervisors without further conditions.
2. Persons with lower qualification must be approved by the dean.
3. There can be external supervisors without the need of a 2nd supervisor.

Tasks of Scientific Board/Supervisor

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

Duration: the standard length of study is three years (four to five years in part-time).

3.5.2. 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.
2. Extension: 120 hours in the first year and 60 hours in the second year.
3. Credit system: no credit system.
4. Monitoring of the doctoral student. In case of failure the student must retake the exam or take a different course unit.

Contribution to Teaching

Supervision of undergraduate laboratory work.

Presentation of Work

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

3.5.3 Thesis Work

Submission of Doctoral Written Thesis

1. Language: Czech. Alternative language: English.
2. No credits allocated to the doctoral thesis.
3. The doctoral thesis is a previously unpublished substantial written report.

Oral Presentation of Thesis Work

1. Language normally used: Czech. Alternative language: English.
2. Oral presentation with oral examination for an open/public audience.
3. Duration: typical duration of 1 hour including examination with an upper time limit of 2 hours.

3.5.4. Examination

Thesis Examination Board

1. Composition: four internal examiners and four external examiners (eight members).
2. Selection 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 no grading system.
2. If the student fails, he/she may not resubmit for doctorate. The students pass a final examination (generally) at the end of the second year of their doctoral studies, passing this examination is compulsory for being eligible to submit the thesis and the examination is valid for five years, if a student does not finish his studies within this period, he must restart the studies from the very beginning.

3.6. Questionnaires

Czech 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?	32
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:	
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: N

3.1.8 The thesis supervisor of a doctoral student can be:

3.1.8.1 Any professor or lecturer 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 professor and assistant professor are eligible to serve as a supervisor without further conditions, persons with lower qualification must be approved by the dean; there can be external supervisors without the need of a second supervisor.

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 supervisor and published, students interested in doctoral studies chose 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- COURSE WORK

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
		120 hrs	60 hrs	0 hrs	0 hrs

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.

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

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

3.2.3.2 Is it the ECTS system?
If not, what is the relationship with ECTS?

3.2.3 Credit system

3.2.3.3 How many credits are allocated to coursework? credits

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 or 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?	Czech
4.1.2	Are alternative languages used for the thesis? Please Specify: English.	Y
4.1.3	Which language is normally used for the oral presentation and/or examination?	Czech
4.1.4	Are alternative languages used in the oral presentation and examination? Please Specify: English.	YES
4.1.5	Are credits allocated to the doctoral thesis?	N
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.	
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?	YES
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?	Y ²
	² According to the regulations, the duration should not exceed 2 hours.	
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.	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
	Students pass a final examination (generally) at the end of the second year of their doctoral studies, passing this examination is compulsory for being eligible to submit the thesis and the examination is valid for five years, if a student does not finish his studies within this period, he must restart the studies from the very beginning.	

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
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CZ: Česká republika (Czech Rep.)

City	Name of the institution (national language)	Name of the institution (English)	http address
Brno	Vysoké učení technické v Brně	Brno University of Technology	<i>Fakulta elektrotechniky a komunikačních technologií</i> (Faculty of Electrical Engineering and Communication) http://www.feec.vutbr.cz
			<i>Fakulta informačních technologií</i> (Faculty of Information Technology) http://www.fit.vutbr.cz
Brno	Masarykova univerzita v Brně	Masaryk University Brno	<i>Fakulta informatiky</i> (Faculty of Informatics) http://www.fi.muni.cz
Ostrava	Vysoká škola báňská – Technická univerzita Ostrava	VSB – Technical University of Ostrava	<i>Fakulta elektrotechniky a informatiky</i> (Faculty of Electrical Engineering and Informatics) http://www.vsb.cz/en/vitejte_ewel.htm
Pardubice	Univerzita Pardubice	University of Pardubice	<i>Ústav informatiky</i> (Department of Informatics) http://international.upce.cz/index_eng.html
Plzeň	Západočeská univerzita Plzeň	University of West Bohemia Pilsen	<i>Fakulta elektrotechnická</i> (Faculty of Electrical Engineering) http://www.fel.zcu.cz/index-e.html
Praha	České vysoké učení technické v Praze	Czech Technical University in Prague	<i>Fakulta elektrotechnická</i> (Faculty of Electrical Engineering) http://www.cvut.cz/fee/index.html