

## 12. IS: Lýðveldið Ísland (Republic of Iceland)

**Author:** Karl Gudmundsson (University of Iceland, karlsg@hi.is)

### 12.1. General information



A fundamental principle of the Icelandic education system is that everyone shall have equal opportunities to acquire education irrespective of sex, economic status, geographic location, religion, cultural or social background. Education is compulsory (primary and lower secondary education) from age 6 through age 16, i.e. for 10 years. Emphasis is placed on providing the opportunity for upper secondary education and everyone has the legal right to enter school at that school level irrespective of results at the end of compulsory schooling.

The educational system is divided into four levels: *Leikskóli* (pre-school) up till 6 years of age, *grunnskóli* (compulsory - primary and lower secondary in a single structure) 6 – 16 years of age, *framhaldsskóli* (upper-secondary) 16 – 20 years of age and *háskóli* (higher education level) from 20 years of age.

Compulsory school is divided into ten grades. Officially there is no selection or streaming by ability and children automatically go up from one grade to the next according to age. Three types of schools are the most common: schools that have all ten grades, schools that have grades one to seven and schools that have grades eight to ten. Schools that have grades eight to ten are often merger schools, i.e. they take in pupils from more than one school in the catchment area that has grades one to seven.

Nationally co-ordinated examinations at the end of compulsory education are optional, i.e. the pupils can choose if and how many nationally co-ordinated examinations they take. Pupils are able to choose between examinations in six subjects, i.e. Icelandic (*íslenska*), Danish (*danska*), English (*enska*), mathematics (*stærðfræði*), natural sciences (*náttúrufræði*) and social sciences (*samfélagsgreinar*). These examinations are composed, marked and organised by the Educational Testing Institute.

The purpose of these examinations is primarily to indicate the pupil's standing at the completion of his compulsory education and to assist her/him in choosing a course of upper-secondary study. The student also receives separate grades in these subjects from his school.

Admission requirements to different branches of study at the upper secondary level may be different, according to what academic demands are made by the branch of study in question.

The general admission requirements for the academic programmes are: students must have taken a nationally co-ordinated examination in Icelandic and Mathematics and in additional two subjects, depending on the programme they choose.

There are four types of branches of study at upper secondary school level: academic branches of study leading to *stúdentspróf* (matriculation examination), vocational branches of study, fine arts branches of study, and a short general branch of study. The branches of study are of differing lengths, from one to eight semesters. Each branch of study is organised into core subjects, elected fields and free selection. Pupils in art and vocational programmes have the possibility of doing additional studies to complete the *stúdentspróf* (matriculation examination).

The main types of upper secondary schools are as follows:

- *Menntaskólar* (grammar schools) which offer a four-year academic course of study concluding with a *stúdentspróf* (matriculation examination), i.e. a university entrance examination.
- *Fjölbrautaskólar* (comprehensive schools) which offer an academic course comparable to that of the grammar schools concluding with a matriculation examination. These schools offer also theoretical and practical training as in the industrial-vocational schools (see below) and, in addition, some other programmes providing vocational and artistic education.
- *Iðnskólar* (industrial-vocational schools), which offer theoretical and practical programmes of study in the certified and some non-certified trades.
- *Sérskólar* (specialised vocational schools) which offer specialised programmes of study as preparation for specialised employment.

Most of the upper secondary institutions are public, run by the state, but some are private, the private schools are also funded by the state. Some of the secondary schools offer adult/evening education and one of them offers the International Baccalaureate. One of the private secondary schools offers the academic course curriculum in two calendar years instead of four academic years.

The Icelandic term "*háskoli*" is used to refer both to traditional universities and institutions which do not have research responsibilities. Consequently there is not a formal distinction between non-universities and universities among higher education institutions.

At present there are seven higher education institutions in Iceland. Most of them are run by the state. Three of them are semi-private, receive government grants, but have private boards and charge tuition. One is multifaculty university, three have three to five faculties and the remaining three are specialized higher education institutions.

Students commencing university study in Iceland must have completed a stúdentsspróf (matriculation examination) or comparable course of studies, or have an equivalent level of maturity and knowledge in the estimation of the administration of the university in question.

It must be ensured that university entrance requirements and study standards correspond to what is currently demanded in recognised universities in similar fields abroad.

Universities may set specific additional entrance requirements if necessary, including requiring students who fulfil the above-mentioned requirements to sit for entrance examinations or assessment examinations.

Different methods may be used for selecting students at universities: In some cases everyone who fulfils the entrance requirements may register. In other cases everyone who fulfils the entrance requirements may register, but competitive examinations are held after the first semester (*numerus clausus*). Some institutions choose the best students based on the applications, while entrance examinations are used in others.

#### 12.1.1 *Electrical and Information Engineering in Iceland, boundaries of the field of study*

Electrical and Computer Engineering has traditionally included all disciplines at Departments of Electrical Engineering. It means Power Engineering, Electronics, Automation and Systems Control, and Communications Engineering. In 1988 a new department of Computer Science was launched which later offered a programme in Software Engineering, besides Computer Science. Computer Science programmes are now offered by three universities in Iceland but the University of Iceland is still the only one that offers degrees in Electrical and Computer Engineering.

#### 12.1.2 *Content, degrees and accreditations*

A workload based credit system was introduced in the 70's. In the system 30 credits denoted full time studies for one year. ECTS was used for transfer, one Icelandic credit equivalent to two ECTS credits. A new credit system was implemented in 2006, based on workload as before, but now 60 credits are allocated for one year full time studies. Teaching in universities shall be organised in courses, which are evaluated in standardised course credits. Universities decide which programmes of study they offer within their certified fields of study

The Minister of Education, Science and Culture issues a National Qualification Framework for Iceland. Universities are required to issue a learning-outcome description, for every study programme they offer, and this description must fulfil the requirements set for that specific level in the NQF.

### 12.1.3 Implementation of the Bologna-BMD system in Iceland

A three cycle system was already in existence in Iceland before the Bologna process. A 1.5 to 2 years masters degree was implemented in 1923 and a 3 to 4 year bachelor degree was implemented in 1942. Most disciplines used the bachelor-masters system although some used the older 4 to 6 years, one tier *candidatus* degree. Today the one tier *candidatus* degree is only used in Medicine and Dentistry. The Faculty of Engineering, established in the early forties, offered a four year *candidatus* degree until 1997 when it implemented the bachelor-masters system.

## 12.2. **Figures on the weight of EIE in Iceland**

In 2007 9.786 students in all disciplines were enrolled in the University of Iceland. Of these 245 were enrolled in Electrical and Computer Engineering, Software Engineering or Computer Science.

### 12.3. **Degrees in EIE in Iceland**

	<i>BS</i> (3 years)	<i>MS</i> (2 years)	<i>Ph.D.</i> (3 years)	<i>Polytechnic BS</i> (3.5 years)
<b>Computer Science</b>	3	2	1	
<b>Software Engineering</b>	2	2	1	
<b>Electrical and Computer Engineering</b>	1	2	1	1

Number of schools awarding degrees in EIE.

## 12.4 **References**

<http://www.hi.is>

<http://www.unak.is>

<http://www.ru.is>



## **12.5. Doctoral Studies in Iceland**

### **12.5.1. Supervision**

#### ***Scientific Board***

The Scientific board has at least three members elected by the Faculty/Department. The student has the same personal supervisor during his thesis work on an active research area of the department. Supervisor is professor leading research in some area. Doctor students are coming to do research on area of his supervising professor. Of course there are no strict limitations.

#### ***Subject Assignment***

Subject assigned at the beginning of the doctoral studies, or after a specified period of coursework. Sometimes after 1 or 2 years of research dealing with thesis it might be necessary to trim the subject of thesis. The thesis subject is assigned by agreement between the student and the supervisor.

#### ***Who can be a Supervisor***

The official supervisor, who is responsible for the guidance of the doctoral student, must have an official position at the university. The supervisor is normally a professor or docent. There could be other tutors to help the official supervisor in guiding the doctoral student.

#### ***Tasks of Scientific Board/Supervisor***

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

#### ***Duration***

Three years.

## **12.5.2. Development**

### ***Courseware?***

Yes.

### ***Course Work***

1. The students have to take course work during their doctoral degree preparation offered as specialist graduate course units. The course work in some cases can be assessed by examinations and/or by projects. If the student fails in the course work, he/she can retake the exam, or take a different course unit.
2. Extension: not available.
3. Credit system: ECTS. 60 credits are allocated to the course work:
4. Monitoring of the doctoral student taking coursework.

### ***Contribution to Teaching***

1. Supervision of undergraduate laboratory work.
2. Tutoring of undergraduate groups.
3. Marking of undergraduate assessments/homework.

### ***Presentation of Work***

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

Other: by publishing papers in international scientific magazines, in national papers and research reports at our university.

### 12.5.3. Thesis Work

#### ***Submission of Doctoral Written Thesis***

1. Language normally used: English. All doctoral theses so far have been written and published in English and oral presentation delivered in English. Rules for the Ph.D. programmes in engineering require one of the two opponents at the doctoral defence to come from an international university or research institute and so English is a de facto language for the Ph.D. programmes.
2. Credits are allocated to the doctoral thesis.
3. The doctoral thesis can be a previously unpublished substantial written report (monograph), or a collection of individual or co-authored scientific papers with an introduction and/or commentary.

#### ***Oral Presentation of Thesis Work***

1. Language normally used: English.
2. Oral presentation with oral examination for an open/public audience.
3. Duration: typical duration of 2 hours.

### 12.5.4. Examination

#### ***Thesis Examination Board***

1. Composition: At least two external examiners, one of them from an international research institute.
2. Selection the faculty committee chooses the examination board, upon recommendation of the faculty science committee and the supervisor.

#### ***Evaluation***

1. Result based on the reading of the thesis and the oral presentation of the thesis work, with a mark of "Fail" or "Pass".
2. If the student fails, he/she may resubmit a revised thesis. The student may not resubmit for doctorate. Reviewers give their statement if the thesis has scientifically good quality to be published or not. In this phase the thesis is revised so that the scientific committee of the institution can give the permit to publish the thesis. That is why it is unheard of the candidate failing in public defence.

## 12.6. Questionnaires

### *Iceland*

#### 3 – ACTIVITIES DURING DOCTORAL STUDIES

##### 3.1- SUPERVISION OF DOCTORAL STUDIES

- |                |   |                  |
|----------------|---|------------------|
| <b>3.1.1</b>   | Are the doctoral studies supervised by a Scientific Board/supervisor? If no, please proceed to 3.1.5. | YES              |
| <b>3.1.2</b>   | <b>How many members are in the Scientific Board?</b>  | At least 3       |
| <b>3.1.3</b>   | How are the members of the Scientific Board chosen?   |                  |
| <b>3.1.3.1</b> | Elected by the Faculty, Department?   | YES              |
| <b>3.1.3.2</b> | Chosen by the student?  | NO               |
| <b>3.1.3.3</b> | Chosen in another way? Please specify:  | NO               |
| <b>3.1.4</b>   | Which are the main tasks of the Scientific Board/ Supervisor?   |                  |
| <b>3.1.4.1</b> | General management of the doctoral studies.   | YES              |
| <b>3.1.4.2</b> | Deciding the layout of the course, advising the students on their coursework.                         | YES              |
| <b>3.1.4.4</b> | Assigning the thesis subject.   | YES              |
| <b>3.1.4.5</b> | Other. Please specify:  |                  |
| <b>3.1.5</b>   | Does the student need a personal supervisor during her/his studies?                                   | YES <sup>1</sup> |
| <b>3.1.5.1</b> | Does the same person supervise her/his thesis work?   | YES              |
| <b>3.1.6</b>   | Must the subject of the doctoral thesis be an active research area in the department?                 | YES <sup>2</sup> |

<sup>1</sup> **Supervisor is a professor in department where doctoral student is aiming to do his thesis.**

<sup>2</sup> **Supervisor is professor leading research in some area. Doctor students are coming to do research on area of his supervising professor. Of course there are no strict limitations.**



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? | YES              |
| 3.1.7.2 | After a specified period of coursework?   | YES <sup>3</sup> |
| 3.1.7.3 | Other. Please specify:                    |                  |

<sup>3</sup> Sometimes after 1 or 2 years of research dealing with thesis it might be necessary to trim the subject of thesis.

3.1.8 The thesis supervisor of a doctoral student can be:

- |           |   |                 |
|-----------|---|-----------------|
| 3.1.8.1   | Any professor or lecturer in the department?  | NO <sup>4</sup> |
| 3.1.8.2   | Any researcher in the department?   | NO              |
| 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? | NO              |
| 3.1.8.3   | Any researcher in another institution?  | NO              |
| 3.1.8.3.1 | In the latter case, is there a need for an internal supervisor?   | NO              |
| 3.1.8.4   | Other methods. Please specify:  |                 |

<sup>4</sup> The official supervisor, who is responsible for the guidance of the doctoral student, must have an official position at the university. The supervisor is normally a professor or docent. There could be other tutors to help the official supervisor in guiding the doctoral student.

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? YES<sup>5</sup>

3.1.9.2 Other methods. Please specify:

<sup>5</sup> The scientific board of the faculty gives the permit to publish the thesis. At this phase the final name of the thesis is given if it is not clear already. The scientific board also nominates two reviewers for the thesis from other organisations. Reviewers give their statement about the scientific quality of thesis and propose the permit for publication or not. After the permit for publication there is a public defence of the thesis. The doctor candidate defends his thesis against the opponent. The opponent is also nominated by the scientific board and he has to be from other organisation. After the public defence of the thesis the opponent gives his statement about the defence. If it is passed then the scientific board will accept the thesis and give the grade to the candidate about his thesis.

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. YES

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
	hrs	hrs	hrs	hrs

**The Ph.D. student has to take 60 ECTS credits of coursework, in consultation with his supervisor and scientific board. Assessments are done by exams and/or by projects.**

3.2.2.2 In which form is this coursework offered?

- As specialist graduate course units. YES

- As course units taken from the undergraduate programme. NO

- Other. Please specify.

3.2.2.3 Is the coursework assessed by examinations? If not, please give details: YES and NO

## 3.2- COURSE WORK

**3.2.3 Credit system**

- 3.2.3.1** Is the coursework in your institution described by a credit system? YES
- 3.2.3.2** Is it the ECTS system? YES  
If not, what is the relationship with ECTS?
- 3.2.3.3** How many credits are allocated to coursework? **Total of 60 credits**

**3.2.4 Monitoring**

- 3.2.4.1** Do you monitor the performance of the doctoral student taking coursework? YES
- 3.2.4.2 What regulations apply in case of failure in one or more course units?**
- Retake the exam. YES<sup>6</sup>
  - Take a different course unit. YES<sup>6</sup>
- <sup>6</sup> **Normally this isn't a problem.**

## 3.3- PRESENTATION OF WORK RESULTS:

- 3.3.1** In the department. YES<sup>7</sup>
- 3.3.2** At national conferences. YES<sup>8</sup>
- 3.3.3** At international conferences. YES
- <sup>7</sup> **YES, methods vary; <sup>8</sup> YES, if any. Other: by publishing papers in international scientific magazines, in national papers and research reports at our university.**

## 3.4- CONTRIBUTION TO TEACHING:

- 3.4.1** Supervision of undergraduate laboratory. YES
- 3.4.2** Teaching undergraduate courses. YES
- Tutoring undergraduate groups, marking of undergraduate assessments/homework, and all normal teaching activities.**

**4 - AWARDING OF DOCTORAL DEGREE**

4.1- SUBMISSION OF DOCTORAL THESIS

4.1.1	Which language is normally used for the thesis?	English
4.1.2	Are alternative languages used for the thesis? Please Specify:	NO
<b>All doctoral theses so far have been written and published in English and oral presentation delivered in English. Rules for the Ph.D. programmes in engineering require one of the two opponents at the doctoral defense to come from an international university or research institute and so English is a de facto language for the Ph.D. programmes.</b>		
4.1.3	Which language is normally used for the oral presentation and/or examination?	English
4.1.4	Are alternative languages used in the oral presentation and examination? Please Specify:	NO
4.1.5	Are credits allocated to the doctoral thesis?	YES
4.1.6	<b>The doctoral thesis is:</b>	
4.1.6.1	A previously unpublished substantial written report.	YES
4.1.6.2	A collection of individual or co-authored scientific papers with an introduction and/or commentary.	YES
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? <b>Yes, it is a public defence.</b>	YES
4.2.2	Composition of the thesis examination board. Please, give the typical number of:	
4.2.2.1	Internal examiners.	*
4.2.2.2	External examiners.	2
4.2.2.3	TOTAL.	

**The scientific board along with the faculty committee review the thesis before it is accepted to a defence. For the doctoral defence two opponents are required. They act too as reviewers.**

4.2- THESIS EXAMINATION AND DEGREE AWARDING

<b>4.2.3</b>	How is the examination board chosen?	
<b>4.2.3.1</b>	By the supervisor.	YES
<b>4.2.3.2</b>	By the scientific committee of the institution.	YES
<b>4.2.3.3</b>	By the rector or equivalent.	
<b>4.2.3.4</b>	By the national ministry.	
<b>4.2.3.5</b>	Other. Please specify:	YES
	The faculty committee chooses the examination board, upon recommendation of the faculty science committee and the supervisor.	
<b>4.2.4</b>	Do the examiners base their evaluation mark on:	
<b>4.2.4.1</b>	Reading the thesis.	YES
<b>4.2.4.2</b>	The oral presentation of the thesis work.	YES
<b>4.2.4.3</b>	Both.	
<b>4.2.4.4</b>	What is the typical duration of the oral part of the thesis examination, if applicable?	2 hours
<b>4.2.4.5</b>	Is there an upper limit to the duration of the thesis examination?	NO
<b>4.2.5</b>	Is the oral part of the examination taken behind closed doors?	No, it is public.
<b>4.2.6</b>	What happens if the student fails?	
<b>4.2.6.1</b>	May not resubmit for doctorate.	YES <sup>9</sup>
<b>4.2.6.2</b>	May resubmit revised thesis.	MAYBE
<b>4.2.6.3</b>	May do further work as specified by examination board.	NO
<b>4.2.6.4</b>	If the thesis is to be re-submitted is there a time limit for this to occur? Please specify:	YES/NO

**<sup>9</sup> Reviewers give their statement if the thesis has scientifically good quality to be published or not. In this phase the thesis is revised so that the scientific committee of the institution can give the permit to publish the thesis. That is why it is unheard of the candidate failing in public defence.**

4.2- THESIS EXAMINATION AND DEGREE AWARDING

<b>4.2.7</b>	Is there a grading system for the doctoral degree based on the quality of the work? <b>Only "Pass" or "Fail".</b>	YES
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