

18. NO: Norge/Noreg (Norway)

Coordinating author: Saba MYLVAGANAM (EAEEIE, Høgskolen i Telemark,

saba.mylvaganam@hit.no)

Other contributors: Professor Einar Aas (Norwegian University of Science and Technology (NTNU), ainer.aas@iet.ntnu.no), Professor Kjell MALVIG (Norwegian University of Science and Technology, (NTNU), Kjell.Malvig@itk.ntnu.no)

Lecturer Mr. Gerhard NYGÅRD, Research Advisor, International Research Institute of Stavanger, Gerhard.Nygaard@iris.no

Review: Cyril BURKLEY (EAEEIE, University of Limerick, Ireland)

18.1. General Information



The institutional types for higher education in Norway are as follows : Universities, (Universiteter) University Colleges (Vitenskapelige høyskoler), State Colleges (Statlige høyskoler), Art Colleges (Kunsthøyskoler) and Private institutions of higher education (Privathøyskoler). For our survey, the focus will be mostly on the first three types of institutions. The Norwegian Higher Educational System is very closely aligned to the 3-5-8 model with some variations particularly at the PhD level. The entry requirements are based on candidates' prior education or completed vocational training with certificate of completed apprenticeship (very often called "Y-vei" in Norway). The way to bachelor degree for candidates with completed apprenticeship is now offered in many higher educational institutions in Norway covering many disciplines of engineering. The model has been praised for its success both in national and international arenas.

From secondary school to university education in Norway.

Some figures:

- 2 years diploma of technician in Norway
- 3 years Bachelor of science
- 30000 students in "External Distance learning programmes"

<p>NO: Norge/ Noreg (Norway)</p>	<p><u>General information [REF 1], [REF 5], [REF 19]</u> "In Norway, many university professors argued strongly against the change from a four-year degree to a three-year bachelor-degree. The parliament adopted a new degree system in June 2001 which will be introduced between autumn 2002 and the end of 2003. The new system follows the 3+2+3 pattern. In addition to the 120 ECTS Master, there is an international Master (60–90 credits) and an experience-based Master (60–90 credits). All public higher education institutions – universities and state</p>
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colleges – will offer the new degrees. Bachelor and Master's degrees will be introduced, not by law, but by Government decision. The revised law gives universities full freedom to start any course at any level; state colleges will have such rights for lower level degrees. The Law on Private Higher Education has also been changed and a new Law on Higher Education (state and private) is envisaged as the next step in the process of giving the institution greater autonomy, but at the same time also greater responsibility. The reform also includes implementation of the Diploma Supplement. They will be issued automatically.” According to NOKUT, “In response to the Bologna Process which started in 1998, a Quality Reform was launched in 2001. It introduced bachelor’s, master’s and PhD degrees generally following a 3 year + 2 year + 3 year model. The new degrees superseded the old ones (mainly 4 year + 2 year + 3 year, as e.g. cand.-mag., cand.-philol., cand.- scient., dr.-polit., dr.philos. etc.) from the end of 2003. The old degrees will be completely phased out by the end of 2007. The Quality Reform also introduced a concept to establish stricter quality assurance mechanisms in higher education which resulted in the founding of an independent agency for quality assurance in education – NOKUT (Norwegian Agency for Quality Assurance in Education).”

Specific view provided by EIE-Surveyor partner
 As per today Bologna process has been successfully implemented in all the major higher educational institutions in Norway. Many state colleges in Norway are successful in recruiting students to Bachelors programmes based on their completed apprenticeships (so called Y-Vei in Norwegian) thus helping aspiring technical personnel to continue their studies to Bachelors level, thus paving the way for them to even higher levels, irrespective their ages. We see a trend in many institutions of offering the courses in English thus catering to an increasing number of international students. Government Commission for Higher Education of 2006 called “Stjernø-Utvalget” has looked into the possibilities of integrating existing universities and state colleges of forming clusters thus paving the way to larger and fewer official higher educational institutions in Norway. The discussion is a current phenomenon in Norway and reflects the very dynamic environment of education in general. As such, readers should always refer to the dedicated web-pages of the institutions and government organisations given below.

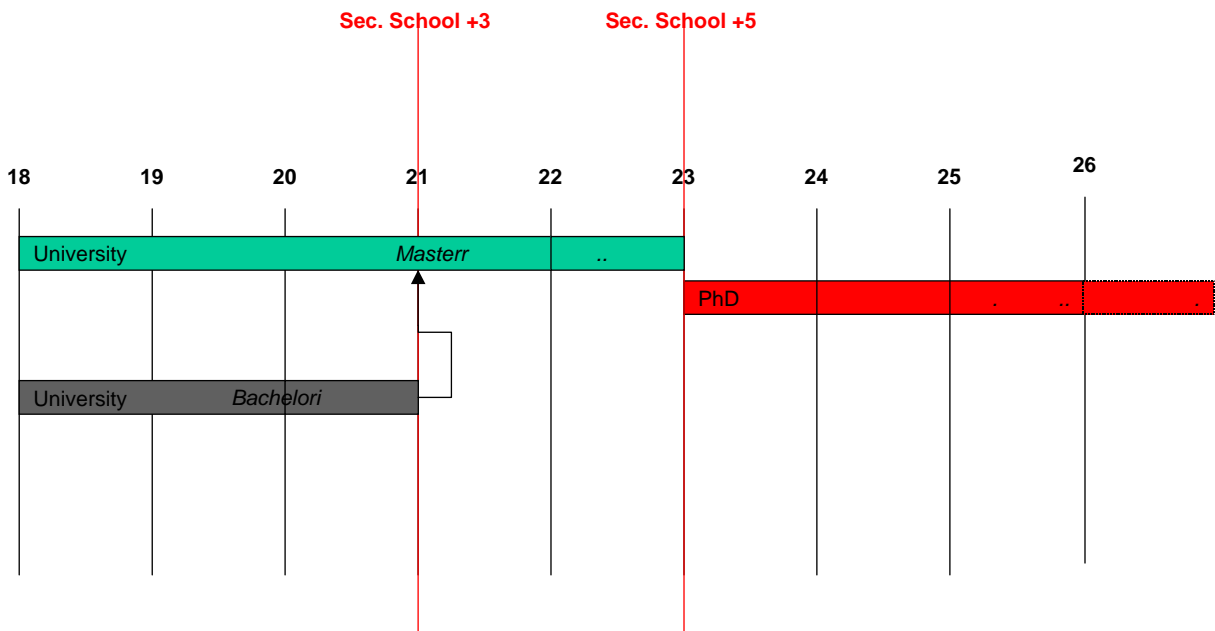


Figure 18.1: Norwegian Higher Education System in EIE disciplines - general trend in the carrier of students. For more details see Figure 18.3. In case of completed apprenticeship, the age of entry may vary considerably.

As of 1994, every child in Norway is offered 12 years of primary and secondary education. The 9 first years are compulsory, while the last 3 years in upper secondary school are voluntary, and end with an examination, which determines entry to higher education, including engineering. Figure 18.1 gives an overview of technical education in Norway, starting from Secondary School.

In Norway, both university and non-university education is offered in engineering. Appendix A contains a list of institutions. The university degree is now accepted to be Bachelors (normally of 3 –years duration) Masters. Nominal time to obtain the Masters degree is 5 years.

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

This is a difficult question. Elements of EIE are found in many disciplines now. The trend is some stand-alone degrees in Informatics, Electronics, Cybernetics, Mechatronics, Computer Science etc. In recent times, there is also a focus on Bioinformatics. With more and more courses becoming interdisciplinary, the demarcation is getting increasingly blurred.

18.1.1 Content, degrees and accreditations

Due to a new rule (as the results of "Mjøsutvalget", committee headed by Prof. Mjøs (medicine)) the colleges and universities have a certain amount of freedom, although the framework is defined by the ministry.

Usually this information is available on the webpage of the colleges / universities.

At NTNU and Telemark University College, particularly in engineering disciplines, course evaluation is used extensively, with student based evaluation of all 1-3 year courses. A system for this evaluation has been developed since 1988. Teacher evaluation has been limited now due to legal problems concerning use of personnel data base information. Programme evaluation, however, is less frequent. Such evaluation is initiated in various fields of higher education from the Institute for Studies in Research and Higher Education, a body of the Norwegian Council of Science. In 1995, an in-depth evaluation of the university and non-university electronic engineering education at 21 universities and technical colleges was completed. The objective of this evaluation was defined thus: Provide qualified assessments of each institution's educational profile, and strong and weak facets in a national and international context. The committee shall not rank the institutions. The assessment shall conclude with a list of actions that may be implemented to improve the education and the learning environment. An important instrument was the self-evaluation phase, resulting in a report read by the experts who conducted the peer review. After assessing the self-evaluation report, the experts visited each institution for two days, and later wrote an evaluation report. These reports are open to the public.

Implementation of the Bologna-BMD system in Norway¹¹

According to the “The Norwegian Agency for Quality Assurance in Education” (called Nasjonalt organ for kvalitet i utdanningen (NOKUT)) , we have the following information on the implementation of Bologna process in Norway:

“In response to the Bologna Process which started in 1998, a Quality Reform was launched in 2001. It introduced bachelor’s, master’s and PhD degrees generally following a 3 year + 2 year + 3 year model. The new degrees superseded the old ones (mainly 4 year + 2 year + 3 year, as e.g. cand.-mag., cand.-philol., cand.-scient., dr.-polit., dr.philos. etc.) from the end of 2003. The old degrees will be completely phased out by the end of 2007. The Quality Reform also introduced a concept to establish stricter quality assurance mechanisms in higher education which resulted in the founding of an independent agency for quality assurance in education – NOKUT (Norwegian Agency for Quality Assurance in Education).”

Norway has probably implemented the Bologna process successfully in all higher educational institutions coming under NOKUT.

Qualification framework

Norway has been successful in implementing the BMD-system since 2003 nationwide.

¹¹ Based on information provided by Professor Kjell Malvig, Norwegian University of Science and Technology, (NTNU)

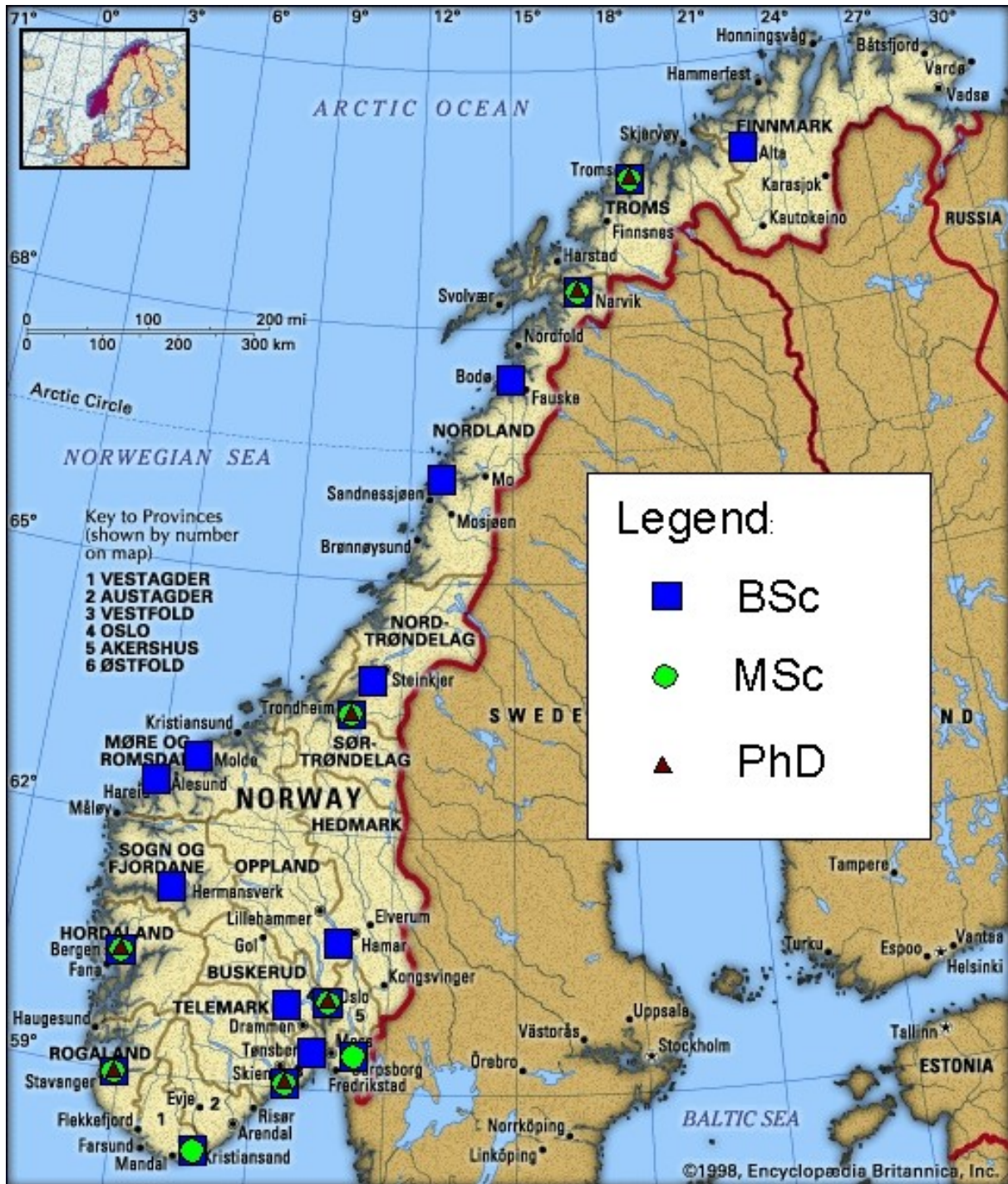


Figure 18.2: The locations of the educating organisations within the field of IT/Computer Science and Electronic/Cybernetics. Figure prepared by Mr. Gerhard Nygård, PhD student at Tellemark University College, presently on leave from Bergen University College.

The authoritative organisation on qualification and accreditation matters in Norway NOKUT has the following comment:

“In accordance with the Bologna Process recommendations Norway is currently taking part in the work on the planned European Qualification Framework. The objective of this is to create a European framework to enable qualification systems at the national and sectoral levels relate to each other.”

All the universities and colleges offer Bachelors and Masters and as a result also a PhD within the Bologna-BMD concept. Here follows a short introduction to the Bologna system. Presenting the Engineering education in the Nordic countries for own purposes and for the insight of others is essential. Keep in mind that this is dynamic information, because all the processes in the different countries are not finished yet, and the decisions are not yet final.

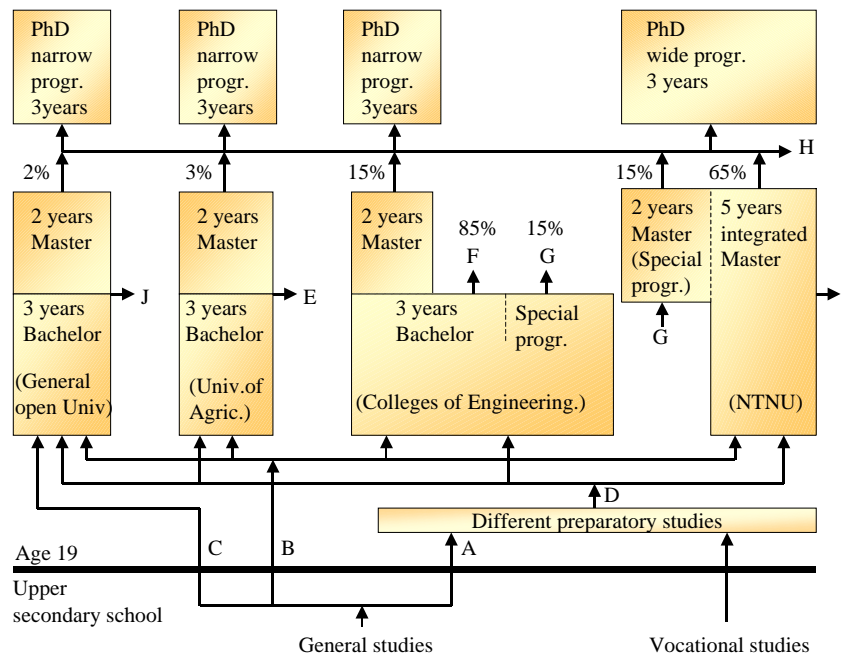


Figure 18.3 Transition from upper secondary school, general studies and vocational studies to universities, university colleges offering BMD. This figure is important to understand what follows below on BMD process in Norway. Please refer to the letters A to J in the figure when reading what follows. Provided by Prof. Kjell Malvig of NTNU

1. Entrance from upper secondary school, General studies or Vocational studies

The letters A-J in the following refer to the different stages of transition to higher education as depicted in Figure 18.3.

- B: First level (upper) Mathematics and second level Physics mandatory
- C: Second level Mathematics and first level Physics recommended but not mandatory
- A: For students without required courses

2. Main Structure:

- 3 years Bachelor (E, F, G, J)
- 3 years study pivot (I) (Virtual)
- 2 years Master (H)

- 5 years integrated Master (H)
- 3 years PhD

3. Participating institutions:

One can say NTNU has the highest percentage of students graduating with Masters.

- NTNU, broad number of programs available on all levels:
 - 5 years integrated Master (65% of total Masters in the nation)
 - 2 years Master based on a Bachelor in the same profession. (Special program for students from other institutions, 15% of Bachelors) (15% of total Masters)
 - 3 years PhD, often with an extra year as Assist. Prof. (98% of total)
- University Colleges of Engineering:
 - 3 years Bachelor, professional, broad number of programs.
 - 3 years Bachelor, professional, special programmes for continuation as Masters on NTNU, broad number of programmes.
 - 2 years Master based on a Bachelor in the same profession. Narrow number of programs.
 - 3 years PhD, often with an extra year as Assist. Prof. (2% of total). Narrow special number of programs
- Colleges of Engineering:
 - 3 years Bachelor, professional, broad number of programs.
 - 3 years Bachelor, professional, special programmes for continuation as Masters on NTNU, broad number of programmes.
- General Universities and Norwegian University of Life Sciences:
 - 3 years Bachelor, probably nonprofessional as engineers, very narrow number of programs. Very few candidates. Questionable in the future.
 - 2 years Master based on a Bachelor in the same topic. Very narrow number of programs. Very few candidates. Questionable in the future.
 - 3 years PhD, often with an extra year as Assist. Prof. Almost no candidates. Very narrow number of programs

4. Academic titles:

- E,F,G,J:
 - Norwegian: *Bachelor* name of curriculum
 - English: Bachelor of Engineering, name of curriculum
- H:
 - Norwegian: *Master i Teknologi*, name of curriculum

English: Master of Science, name of curriculum

5. Professional titles:

- E, F, G, J:
 - Norwegian: *bachelor*, name of curriculum
 - English: Bachelor of Engineering, name of curriculum
- H:
 - Norwegian: *Master*, name of curriculum
 - English: Master of Science, name of curriculum

Doctoral degree programmes in Norway take three years of full-time studies. The structure of the different doctoral programmes varies. Some of the programmes consist of one year of taught courses and a two years research period, where the candidates have to write and defend a dissertation in public. Very often the research period gets an extension.

18.2 Figures on the weight of EIE in Norway

Organisation, (Norwegian Name) (Homepage)	IT/Computer Science	Electronics/Cybernetics
Finnmark University College (<i>Høgskolen i Finnmark</i>)	BSc	
University of Tromsø (<i>Universitetet i Tromsø</i>)	BSc/ MSc, PhD	MSc, PhD
Tromsø University College (<i>Høgskolen i Tromsø</i>)	BSc	BSc(10)
Narvik University College (<i>Høgskolen i Narvik</i>)	BSc ,MSc, PhD	BSc,MSc, PhD
Bodø University College (<i>Høgskolen i Bodø</i>)	BSc	
Nesna University College (<i>Høgskolen i Nesna</i>)	BSc	
North-Trøndelag University College (<i>Høgskolen i Nord-Trøndelag</i>)	BSc	BSc
Norwegian University of Science and Technology (<i>Norges Teknisk og Naturvitenskapelige Universitet</i>)	BSc/MSc, PhD	MSc, PhD
South-Trøndelag University College (<i>Høgskolen i Sør-Trøndelag</i>)	BSc	BSc
Ålesund University College (<i>Høgskolen i Ålesund</i>)	BSc	BSc
Molde University College (<i>Høgskolen i Molde</i>)	BSc	
Sogn og Fjordane University College (<i>Høgskolen i Sogn og Fjordane</i>)	BSc	BSc
Bergen University College (<i>Høgskolen i Bergen</i>)	BSc	BSc
University of Bergen (<i>Universitetet i Bergen</i>)	MSc, PhD	MSc, PhD
Naval Engineering College University of Stavanger(<i>Universitetet i Stavanger</i>)	BSc, MSc	BSc, MSc, PhD
Norwegian School of Information Technology University of Agder (<i>Universitetet i Agder</i>)	BSc	
	BSc , MSc	BSc
Telemark University College (<i>Høgskolen i Telemark</i>)		BSc ,MSc,PhD

Vestfold University College (<i>Høgskolen i Vestfold</i>)	BSc	BSc , MSc, PhD
Østfold University College (<i>Høgskolen i Østfold</i>)	BSc, MSc	BSc , MSc
Oslo University College (<i>Høgskolen i Oslo</i>)	BSc	BSc
University of Oslo (<i>Universitetet i Oslo</i>)	MSc, PhD	MSc, PhD
Gjøvik University College (<i>Høgskolen i Gjøvik</i>)	BSc	BSc
Buskerud University College (<i>Høgskolen i Buskerud</i>)	BSc , MSc	BSc, MSc, PhD

Figure 18.4: Figures on the weight of EIE in Norway (compiled by Dr. Gerhard Nygård)

18.3 Degrees in EIE in Norway

The information on various courses can be found in the web - pages of the universities and university colleges given in the table below.

Bachelor level

Currently, there are around 9000 students in the Bachelor of science/engineering programmes. 3600 admissions have been offered each year, but all have not been taken. Thus there are a lot of entries that are not filled, especially at the smaller colleges in Norway. The teaching staff amounts to 900 in total.

- **Conditions for admission**

Basically the same conditions for admission apply as for a university, namely completed upper level secondary school, with sufficient course load in mathematics and physics and/or chemistry. Some schools have limited admission, while others allow everyone with a suitable examination grade to enter, because they still do not fill up the predefined capacity.

- **Conditions for admission**

The nominal duration is set to 3 years. There is a large variation in real duration from college to college. Some colleges have close to 40% dropout, while others have only 10%.

- **Structure of the Bachelor programmes**

The basic structure for the three-year “*bachelor*” study program is shown below. The different study programmes are listed in Appendix B.

Master level

The M. Sc. degree is recognised by the professional environment, and provides access to all kinds of engineering professions in Norway. It is also recognised as the entry-point for a doctoral degree.

- **Conditions for admission**

The basic condition for admission is successful examination results from upper level secondary school, with sufficient course load in mathematics and physics and/or chemistry. But as all M.Sc.

programmes have limited numbers of places, the examination marks are used to select those admitted. The marks in mathematics and physics are given highest weight. In addition, some points are granted for work experience and completion of military service. Also, female students are given a small additional advantage. The admission to most engineering subjects at the Norwegian Institute of Technology is very competitive.

In addition to direct entry from upper secondary school, the Norwegian Institute of Technology allows a certain percentage (approx. 20-25%) into the third year with a completed B. Sc. degree from one of the colleges of engineering.

- **Nominal and real duration of the studies**

The nominal duration of M. Sc. studies is 4.5 years. The real duration at the Norwegian Institute of Technology is 4.7 years, and the completion rate has been stable at about 91% (defined as the percentage of students, once entered, who finish with a diploma).

Doctorate level

In principle we have now only one type of doctorate degrees in engineering in Norway, the PhD.

Condition for admission

A completed "*Master*" degree or similar education is required, in addition to a course and research plan endorsed by a supervisor.

Prerequisite or simultaneous doctoral programme

The programme includes a certain workload based on courses and a thesis. Normally, the candidate works on both these at the same time. The course load corresponds to one full year of study, while two years are allocated for the research and thesis work. At least one third of the courses are to be at doctorate level, the others may be selected from the normal graduate courses.

Nominal and real duration

Nominal duration is 3 years. Recently, there has been a change to three years of study plus one year of service work for the host department (teaching, grading, supervision etc.), thus allowing for 4 years of calendar time. The average real duration is 3.8 years.

Number of students

More than 100 dr. ing. degrees are awarded every year. There has been an increase from 90 to 129 in 1994.

Main types of financing

Most scholarships are granted directly from the university. Other sources are: the Norwegian Research Council, the Norwegian Telecom, several large companies, and EU programmes.

Professional recognition

The PhD. degree from Norway is considered to be on an international Ph.D. level, and external opponents, always at least one from abroad, assure that this is the case. Several large Norwegian companies have made it their policy to hire a certain percentage of doctorates.

18.4. References

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

Einar Aas, "ENGINEERING EDUCATION IN NORWAY", A report prepared for the European Commission to the Conference of European Schools for Advanced Engineering Education and Research - CESAER, 1995. (A classic paper on the evolving new educational system in Norway)

<http://www.nokut.no>

<http://www.utdanning.no>

<http://odin.dep.no/odin/>

<http://www.stjerno.no/>



18.5. Doctoral Studies in Norway

18.5.1. Supervision

Scientific Board or Supervisor

The Scientific board is composed by nine members elected by Faculty or 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

Subject assigned at the beginning of the doctoral studies, normally by agreement between the student and the supervisor. Adjustments can be made during the work.

Who can be a Supervisor

1. Only professors.
2. Often there are 1-2 supervisors for cross-disciplinary work.

Tasks of Scientific Board/Supervisor

- | | | |
|----|---|-----|
| 1. | General management | YES |
| 2. | Deciding/advising layout of course | NO |
| 3. | Assigning a thesis subject | YES |
| 4. | The PhD-programmes and PhD courses are the responsibility of the Board. | |

Duration: nominal duration is 3 years. Recently, there has been a change to three years of study plus one year of service work for the host department (teaching, grading, supervision etc.), thus allowing for 4 years of calendar time. The average real duration is 3.8 years.

18.5.2. 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. However a maximum of $\frac{1}{4}$ of the course work course units can be taken from undergraduate programmes.
2. Extension: $\frac{1}{2}$ year, mostly the first two years.
3. Credit system: no ECTS system. $\frac{1}{2}$ year allocated to course work.
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 international conferences.

18.5.3. Thesis Work

Submission of Doctoral Written Thesis

1. Language: English. No alternative languages.
2. No credits 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. Language normally used: English. Alternative language: Norwegian.
2. Oral presentation with oral examination for an open/public audience.

3. Duration: typical duration of 3 hours including examination with an upper time limit.

18.5.4. Examination

Thesis Examination Board

1. Composition: one internal examiner and two external examiners (three members). One of the external members is a full professor from another country.
2. Selection by the scientific committee of the institution.

Evaluation

1. Result based on the reading of the thesis and the oral presentation of the thesis work, with no grading system. However, the committee gives written statements on the level compared to the levels in the home country (One of the external members of the committee is a full professor from another country).
2. If the student fails, he/she may resubmit a revised thesis within six months.

18.5.5. Questionnaires

Norway

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?	9
3.1.3	How are the members of the Scientific Board chosen?	
3.1.3.1	Elected by the Faculty, Department?	Y
3.1.3.2	Chosen by the student?	Y/N
3.1.3.3	Chosen in another way? Please specify:	Y/N
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.	Y
3.1.4.5	Other. Please specify:	
	The PhD-programmes and PhD courses are the responsibility of the Board. We have around 300 PhD student.	
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:

Adjustments can be made during the work.

3.1.8 The thesis supervisor of a doctoral student can be:

3.1.8.1 Any professor or lecturer in the department? N¹

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? Y/N

3.1.8.4 Other methods. Please specify: Y/N

We often have 1-2 co-supervisors, in particular in cross-disciplinary work.

¹ **Only professor.**

3.1.9 The thesis subject is assigned by:

3.1.9.1 Agreement between the student and the proposed supervisor? Y²

3.1.9.2 Other methods. Please specify: Y/N

² Normally.

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
	hrs	hrs	hrs	hrs

In total ½ year, mostly the first two years.

3.2- COURSE WORK

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. 3
- Other. Please specify.

³ Maximum ¼ of the course work at this level.

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

If not, what is the relationship with ECTS?

3.2.3.3 How many credits are allocated to coursework? ½ year

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. Yes
- Take a different course unit.

3.3- PRESENTATION OF WORK RESULTS:

3.3.1 In the department. Yes

3.3.2 At national conferences.

3.3.3 At international conferences. Yes

3.4- CONTRIBUTION TO TEACHING:

3.4.1 Supervision of undergraduate laboratory. Yes

3.4.2 Teaching undergraduate courses. Yes

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:	Y/N
4.1.3	Which language is normally used for the oral presentation and/or examination?	English ⁴
4.1.4	Are alternative languages used in the oral presentation and examination? Please Specify:	YES/NO

⁴ English, but Norwegian in some cases.

4.1.5	Are credits allocated to the doctoral thesis?	N
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4.1.6 The doctoral thesis is:

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. ⁵ Yes, it is two options.	Yes ⁵
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.	1
4.2.2.2	External examiners.	2
4.2.2.3	TOTAL.	

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.	Yes
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
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?	3 hours
4.2.4.5	Is there an upper limit to the duration of the thesis examination?	Y
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: ½ year.	Y
4.2.7	Is there a grading system for the doctoral degree based on the quality of the work? ⁶ N, but the committee gives written statements on the level compared to level in home country. We always have a full professor from another country on the committee.	N ⁶

Bachelor level

Table 18.1. Educational organisations in Norway for Computer Science and Electronics/Cybernetics with associated levels of educations (BSc).

Educating level (BSc)						
Location	Organisation	Owner	Electronics	Cybernetics	IT/Computer Science	Electronics/Cybernetics
Alta	Finnmark University College	Public			BSc	
Tromsø	University of Tromsø	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc ,PhD	MSc, PhD
Tromsø	Tromsø University College	Public		BSc	BSc	BSc(10)
Narvik	Narvik University College	Public	BSc, MSc	BSc,MSc,PhD	BSc, MSc, PhD	BSc, MSc,PhD
Bodø	Bodø University College	Public			BSc	
Mo i Rana	Nesna University College	Public			BSc	
Levanger	North-Trøndelag University College	Public	BSc		BSc	BSc
Trondheim	Norwegian University of Science and Technology	Public	BSc,MSc,PhD	BSc,MSc,PhD	BSc/MSc, PhD	BSc/ MSc ,PhD
Trondheim	South-Trøndelag University College	Public	BSc	BSc	BSc	BSc
Ålesund	Ålesund University College	Public	BSc	BSc	BSc	BSc
Molde	Molde niversity College	Public			BSc	
Førde	Sogn og Fjordane University College	Public		BSc	BSc	BSc
Bergen	Bergen University College	Public	BSc(BSc	BSc	BSc
Bergen	University of Bergen	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc, PhD	MSc, PhD
Bergen	Naval Engineering College	Public	BSc			BSc
Bergen	Norwegian School of Information Technology	Private			BSc	
Stavanger	University of Stavanger	Public	BSc	BSc,MSc	BSc, MSc	BSc, MSc
Stavanger	Norwegian School of Information Technology	Private			BSc	
Grimstad	Agder University College	Public	BSc		BSc, MSc	BSc
Porsgrunn	Telemark University College	Public	BSc,MSc,PhD	BSc,MSc,PhD		BSc ,MSc, PhD
Borre	Vestfold University College	Public	BSc	BSc	BSc	BSc
Sarpsborg	Østfold University College	Public	BSc	BSc		BSc
Halden	Østfold University College	Public			BSc, MSc	
Oslo	Norwegian School of Information Technology	Private			BSc	
Oslo	Oslo University College	Public	BSc	BSc	BSc	BSc
Oslo	University of Oslo	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc,PhD	MSc ,PhD
Gjøvik	Gjøvik University College	Public	BSc	BSc	BSc	BSc
Kongsberg	Buskerud University College	Public	BSc	BSc	BSc	BSc

Table prepared by Dr. Gerhard Nygård, Research Adviser, IRIS

Master level

Table 18.2. Educational organisations in Norway for Computer Science and Electronics/Cybernetics with associated levels of educations (MSc).

Educating level (MSc)						
Location	Organisation	Owner	Electronics	Cybernetics	IT/Computer Science	Electronics/Cybernetics
Tromsø	University of Tromsø	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc ,PhD	MSc, PhD
Narvik	Narvik University College	Public	BSc,MSc	BSc,MSc,PhD	BSc, MSc,PhD	BSc,MSc,PhD
Trondheim	Norwegian University of Science and Technology	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc,PhD	MSc,PhD
Bergen	University of Bergen	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc,PhD	MSc, PhD
Stavanger	Stavanger University College	Public	BSc	BSc,MSc	BSc,MSc	BSc,MSc
Grimstad	Agder University College	Public	BSc		BSc,MSc	BSc
Porsgrunn	Telemark University College	Public	BSc,MSc,PhD	BSc,MSc,PhD		BSc,MSc,PhD
Halden	Østfold University College	Public			BSc,MSc	
Oslo	University of Oslo	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc,PhD	MSc,PhD
Table prepared by Dr. Gerhard Nygård, IRIS.						

Doctorate level

Table 18.3 Educational organisations in Norway for Computer Science and Electronics/Cybernetics with associated levels of educations (PhD).

Educating level (PhD)						
Location	Organisation	Owner	Electronics	Cybernetics	IT/Computer Science	Electronics/Cybernetics
Tromsø	University of Tromsø	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc, PhD	MSc , PhD)
Narvik	Narvik University College	Public	BSc,MSc	BSc,MSc,PhD	BSc, MSc,PhD	BSc, MSc, PhD
Trondheim	Norwegian University of Science and Technology	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc, PhD	MSc, PhD
Stavanger	University of Stavanger	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc, PhD	MSc, PhD
Bergen	University of Bergen	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc , PhD	MSc, PhD
Porsgrunn	Telemark University College	Public	BSc,MSc,PhD	BSc,MSc,PhD		BSc, MSc ,PhD
Oslo	University of Oslo	Public	BSc,MSc,PhD	BSc,MSc,PhD	MSc,PhD	MSc, PhD
Table prepared by Dr. Gerhard Nygård, IRIS.						

NO: Norge/Noreg (Norway)

Colleges and university colleges with their Norwegian names and official English names are given below with their corresponding web-pages for reference.

Universiteter (universities)

City	Name of the institution (national language)	http address
Agder	Universitetet i Agder	http://www.hials.no/
Bergen	Universitetet i Bergen	http://www.uib.no/
Oslo	Universitetet i Oslo	http://www.uio.no/
Stavanger	Universitetet i Stavanger	http://ws.uis.no/
Tromsø	Universitetet i Tromsø	http://ws.uit.no/
Trondheim	Norges teknisk-naturvitenskapelige universitet (NTNU)	http://www.ntnu.no/
Ås	Universitetet for miljø- og biovitenskap (UMB) (Norwegian University of Life Sciences)	http://www.umb.no/

Høgskoler (colleges)

City	Name of the institution (national language)	http address
Ålesund	Høgskolen i Ålesund	http://www.hials.no/
Alta	Høgskolen i Finnmark	http://www.hifm.no/
Bekkestua	Norges Informasjonsteknologiske Høgskole	http://www.nith.no/
Bergen	Norges Handelshøyskole	http://www.nhh.no/
Bergen	Høgskolen i Bergen	http://www.hib.no/
Bergen	Norsk Lærerakademi	http://www.nla.no/
Bergen	Naval Engineering College	
Bergen	Norges Informasjonsteknologiske Høgskole	http://www.nith.no/
Bodø	Høgskolen i Bodø	http://www.hibo.no/
Borre	Høgskolen i Vestfold	http://www.hive.no/
Førde	Høgskolen i Sogn og Fjordane	http://www.hisf.no/
Gjøvik	Høgskolen i Gjøvik	http://www.hig.no/
Grimstad	Høgskolen i Agder	http://www.hia.no/
Halden	Høgskolen i Østfold	http://www.hiof.no/
Kongsberg	Høgskolen i Buskerud	http://www.hibu.no/
Levanger	Høgskolen i Nord-Trøndelag	http://www.hint.no/
Mo i Rana	Høgskolen i Nesna	
Molde	Høgskolen i Molde	http://www.himolde.no/
Narvik	Høgskolen i Narvik	http://www.hin.no/
Oslo	Høgskolen i Oslo	http://www.hio.no/
Oslo	Norges idrettshøgskole	http://www.nih.no/
Oslo	Norges Informasjonsteknologiske	http://www.nith.no/

NO: Norge/Noreg (Norway)

	Høgskole	
Porsgrunn	Høgskolen i Telemark	http://www.hit.no/
Sarpsborg	Høgskolen i Østfold	http://www.hiof.no/
Stavanger	Høgskolen i Stavanger	http://www.his.no/
Tromsø	Høgskolen i Tromsø	http://www.hitos.no/
Trondheim	Høgskolen i Sør-Trøndelag	http://www.hist.no/