



## M.Sc. Projects - Checklist for Students and Supervisors

It is the student's responsibility to over-hold rules, regulations and deadlines for a successful completion of a M.Sc. project/thesis. To meet this end, students need to familiarize themselves with the rules that apply for M.Sc. studies within the School of Science and Engineering and Reykjavik University in general (<https://www.ru.is/tvd/upplýsingar-fyrir-nemendur/> or <https://en.ru.is/sse/student-information/>).

No later than 30 days after the project start the student sends an electronic version (PDF document as a solution to an Assignment in CANVAS) of the signed checklist and project description to the Director of Graduate Studies, where items 1-4 have been addressed.

Items 5-9 need to be addressed by the student and the supervisor at different time points prior to graduation and are only listed here to help guide the student through a successful completion of the M.Sc. project work.

Name of student: Kristján Guðmundur Birgisson

Start date: 28.08.2017

Name of supervisor: Mohammed Abdelfattah

Target graduation date: 16.06.2018

### 1) Size of Project

Select the size of the project. If you want to take the 60 ECTS course (T900-MEIS) you need an approval from your department head. However, this does not apply for ISE students, they can only take 60 ECTS projects. Department heads: (**Civil:** Hera Grímsdóttir, **Biomed:** Haraldur Auðunsson, **Mech./Elect.:** María Sigríður Guðjónsdóttir, **Fin./Man.** Páll Jensson).

☐ T899-MEIS, 30 ECTS

☒ T900-MEIS, 60 ECTS

### 2) Start and Finish

☒ The student and supervisor select Start date (1<sup>st</sup> day of the semester on which the MEIS course is taken) and graduation date which is specified in the RU calendars <https://www.ru.is/almanak/> (semester dependent).

### 3) Course Registration

☒ The student registers for T899-MEIS (30 ECTS) or T900-MEIS (60 ECTS) depending on the outcome of 1). Students need to register for the course each semester the thesis work lasts.

### 4) Project Description

☒ The student sends a **Project Description** (see template below) to the supervisor within 21 days of project starting date. Supervisor comments it and returns to student who corrects it. Supervisor and student sign the finished version, the student scans it and submits to the Director of Graduate Studies ([benhel@ru.is](mailto:benhel@ru.is)) along with the signed checklist within 30 days from Start date.

☒ Project Description needs to be signed by the relevant department head in case of T900-MEIS (60 ECTS). Does not apply for ISE students.

## **Project description**

### **Project title:**

*Smart Microcontroller-Based Integrated Monitoring and Protection System for Three-Phase Power Transformers*

### **Student:**

*Kristján Guðmundur Birgisson - kristjanb15@ru.is*

### **Supervisor:**

*Mohammed Abdelfattah - abdefattah@ru.is*

### **Course:**

*T900-MEIS (60 ECTS)*

### **Degree pursued:**

*MSc in Electrical Engineering*

### **Description (min ½ page):**

*Three-phase power transformers are important equipment in AC electrical power systems. They change the voltage to higher or lower levels for power transmission, distribution or delivery. It is very important to avoid power transformer interruptions and protect it from damaging faults by minimizing their frequencies and durations. Many protective relaying techniques have been developed for power transformer protection such as overcurrent relay for protection against overloading and phase faults, differential relay for zone-based protection against phase and earth faults, earth fault relay for protection against earth faults and gas-actuated (Buchholz) relay for protection against slow developing faults in oil immersed transformers. The smart grids vision utilize real time information and communication technology applications with intelligent-based techniques for protective relaying. A real time monitoring, with processing, of the three phase voltages and currents, temperature and gas-actuated relay signals might enable early prediction of some specific interruptions. Furthermore, the integration between different protective relaying techniques, using advanced microcontrollers capabilities, could form an integrated intelligent protection system.*

### **Goal:**

*The main goal of this project is to propose, or develop, a smart microcontroller-based integrated monitoring and protection system for three-phase power transformers. An experimental model using microcontroller will be developed. A real time monitoring system with suitable alarming functions will be proposed, and an integrated protection system covering all standard relay functions will be designed, implemented experimentally and tested using different types of test fault*

## Schedule:

	Start	Finish
Literature Review	28.8.2017	28.10.2017
Writing chapter 1 and 2	1.9.2017	30.10.2017
Smart Monitoring	28.9.2017	28.1.2018
Protection system	29.10.2017	28.1.2018
Writing chapter 3	29.10.2017	30.1.2018
Experimental implementation	29.1.2018	29.4.2018
Testing	20.2.2018	29.4.2018
Writing chapter 4	10.2.2018	30.4.2018
Finishing the thesis	1.5.2018	15.5.2018
Presentation	5.5.2018	15.5.2018

Student sign.:

Kristján GTS

Supervisor sign.:

Mhamel

Department head sign.:

Hanna S.

Date:

20.9.17

(in case of T900-MEIS)

### 5) Open access

Open access publication of theses is a part of RU policy. If access to a thesis needs to be restricted due to e.g. the protection of intellectual property or to protect commercial interests of a company participating in the MSc project, this needs to be applied for (see Reglur um skil á lokaritgerðum og lokaverkefnum við Háskólann í Reykjavík, [www.ru.is/bokasafn/skemman](http://www.ru.is/bokasafn/skemman)). If restriction of access to a thesis is granted this should be clearly stated in the thesis right after the keywords following the abstract with specification of the date at which the restriction of access should be lifted.

☐ Closing access to thesis will be requested.

☐ Closing access to thesis will not be requested.

### 6) Lab Safety

Students working in labs should contact the lab responsible person for instruction in lab safety.

☐ The project does not involve lab work by the student.

☐ The project does involve lab work by the student and the student has received instructions on lab safety.

### 7) Finish

The schedule for of graduation is as follows (where  $t$  is desired graduation date):

☐ •Final draft of thesis delivered to supervisor  $t-50^*$

- ☐ •If the plan is to write the thesis in a journal manuscript form, this requires approval from the relevant Department Head and the Director of Graduate Studies prior to  $t-50^{**}$
- ☐ •Supervisor comments delivered to student  $t-40^{**}$
- ☐ •Supervisor and Department Head select examiner  $t-25^{**}$
- ☐ •Thesis delivered to supervisor, examiner and Department Head  $t-20^*$
- ☐ •Examiner confirms that thesis is eligible for defence  $t-17^*$
- ☐ •Department head announces thesis defence  $t-17^*$
- ☐ •Defence  $t-14^{**}$  (This is usually a Saturday. **Moving the presentation to the following Monday is not allowed**)
- ☐ •Send MSc thesis poster to Director of Graduate Studies  $t-11^{**}$
- ☐ •Grade posted to the Registrar by SSE office  $t-11^*$
- ☐ •Graduation  $t^{**}$

**\* Can be modified by mutual agreement of the supervisor, student and examiner.**

**\*\* Firm deadlines.**

#### 8) Handing-in

- ☐ The official completion of the MSc thesis is signified by the student submitting an electronic version (PDF) of the thesis, signed by himself/herself, the supervisor(s), the examiner, the program administrator as well as an electronic version uploaded to <http://www.ru.is/bokasafn/skemman/>.

#### 9) Grading

- ☐ Supervisor and examiner sign grade sheet after the defence and supervisor submits grade to SSE office no later than at  $t-11$ .