

Department of Electrical Engineering

**Thesis Proposal**

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| Student Name: | **Kristján Guðmundur Birgisson** |
| Thesis Title: | **Smart Microcontroller-Based Integrated Monitoring and Protection System for Three-Phase Power Transformers** |
| RU Supervisor: | **Mohamed Abdelfattah** |
| Advisor 1: | **Pending** |
| Advisor 2 (optional): | **Pending** |

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| **Description** |
| Please write your thesis proposal, what are the key questions and what original research will your thesis provide? |
| 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. 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 faults. |

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| Time plan |  |  |  |
|  | Start | Finish | Duration |
| Literature Review | 28.8.2017 | 28.10.2017 | 61 |
| Writing chapter 1 and 2 | 1.9.2017 | 30.10.2017 | 59 |
| Smart Monitoring | 28.9.2017 | 28.1.2018 | 122 |
| Protection system | 29.10.2017 | 28.1.2018 | 91 |
| Writing chapter 3 | 29.10.2017 | 30.1.2018 | 93 |
| Experimental implementation | 29.1.2018 | 29.4.2018 | 90 |
| Testing | 20.2.2018 | 29.4.2018 | 68 |
| Writing chapter 4 | 10.2.2018 | 30.4.2018 | 79 |
| Finishing the thesis | 1.5.2018 | 15.5.2018 | 14 |
| Presentation | 5.5.2018 | 15.5.2018 | 10 |

Thesis links:

https://en.ru.is/research/available-masters-and-doctoral-projects/smart-microcontroller-based-integrated-monitoring-and-protection-system-for-three-phase-power-transformers

Skemman publishing:

<http://en.ru.is/skemman>

Declaration of access:

<http://en.ru.is/media/skjol---bokasafn/Declaration-of-access-to-thesis.doc>

Student: Kristján Guðmundur Birgisson

Supervisor: Ass. Prof. Mohamed Abdelfattah

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