Department of Electrical & Electronic Engineering
Independent University, Bangladesh

Senior Project (EEE/ETE-498) Research Proposal Sample

✓Spring / Summer / Autumn 20_12___

1. Student's Name _____*Md. Mhbubur Rahman*_____ ID _____*0820331*_____
2. Supervisor's Name _____*Dr. M. Abdur Razzak*_____ Designation __*Assoc. Professor*_
3. Tentative Title ___*Design & Implementation of a Grid-tie Inverter for Photovoltaic Applications*____

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4. Related Courses Studied

Title _____*Electronics-I*_____ Code ___*ECR-207*___ Grade __*B+*__

Title _____*Electronics-II*_____ Code ___*ECR-407*___ Grade __*B*__

Title _____*Solid Sate Electronics*_____ Code ___*EEE-413*___ Grade __*A-*__

5. Motivation

The increasing demand of global energy for human being, decreasing availability of natural energy sources and concern about global climate change necessitate the development of green energy technologies, and has put the renewable energy in the forefront of global issues. The renewable energy sources such as solar, wind and hydropower generates clean electricity that is alternative of fossil fuels. Solar energy is an important type of renewable energy source that produce direct current (DC) power. Power electronics play an important role for integrating present day's renewable energy into our daily life as an inverter is essential to convert DC power to alternating current (AC) power due to supply the solar power to the grid.

Due to rapid development and increasing use of renewable energy, highly efficient and cost effective equipment such as pure sine wave inverter, charge controller, etc. are highly demanded in the local as well as global market. This research proposal addresses such an issue to design and develop a grid-tie inverter using an advanced modulation technique, called harmonic injection modulation (HIM) to generate power using solar panel and feeding it to the existing power grid.

6. Goals and Objectives

The objective of the proposed research is to design and develop a stable, reliable, compact, efficient and cost effective constant current grid-tie inverter for photovoltaic applications.

7. Research methodology & implementation / validation

The methods that will use to finish this thesis are enlisted here.

- *Learn the basic principle of Pulse Width Modulation (PWM) switching of single-phase inverter and its topology to result a pure sine output waveform.*
- *Design circuits according to development of stand alone mode single phase inverter control system and the circuits related to this thesis work.*
- *Programming of microcontroller to control the output waveform of the inverter.*
- *Simulate the circuit in PSIM to find out the circuit parameters by fine tuning.*
- *Making the hardware prototype and testing the hardware.*

8. Work plan (schedule)

January 2012 – February 2012: Literature Review
March 2012 – April 2012: Design Simulation
May 2012 – June 2012: Hardware implementation & laboratory testing
July 2012: Report writing
August 2012: Preparation for final presentation

9. Expected outcome and impact

The major outcome of this research is aimed to develop a cost effective grid-tie inverter that will contribute to the power crisis solution in Bangladesh. Hopefully, this goal can be achieved by incorporating some cutting edge technologies, such as advanced modulation technique and immittance converter topology, to the grid-tie inverter as discussed in the respective section. In a power-hungry country like Bangladesh, where load shedding is one of the major issues, developing such an efficient grid-tie inverter in utilizing the solar energy source can be highly beneficial and could bring solution to many present problems.

9. Student's signature _____ Date _____

10. Supervisor's signature _____ Date _____