

List of graduation projects topics and proposal guidelines

Topic#1: Power quality Graduation project

This project is not applicable to students in (Ain Shams university, AAST, Banha and Helwan university) since these universities are already equipped with similar projects

The application of capacitors has been widely seen in the case of industries as a compensating effect for power factor. The objective is to have the power factor close to unity to maximize usage potential. In industrial networks with higher level of harmonics, a detailed study must be implemented before the choice of the compensation method.

This Graduation project introduces the conventional power factor correction methods with a deeper study towards the effect of harmonics and the nowadays solutions for these problems.

Objectives:

1. Build demonstration kit for power quality education including detection, correction and calculation of different solutions to the problem

Proposal shall include:

1. Collective survey of similar demonstration kits used in other universities in the world addressing the same objective
2. Innovative ideas to link the project to existing, experiments/equipment in the student's university lab
3. Photographs from student's university lab to demonstrate the innovative ideas this project can bring to enhance the educational topics
4. The proposal shall include implementing a simple linear R-L load and a harmonic generating loads (fluorescent lamps or a simple drive)
5. Demonstration how different measuring tools and lab instruments already existing in student's lab can be used in the experiment (Avometer, Digital power meters, oscilloscope etc....)
- 6.

Available components:

1. VARlogic controller
2. Three capacitor steps
3. Power contactors
4. Inrush resistance contactors
5. Illuminating switches
6. Current transformer
7. Miniature circuit breakers

* Students must include in their proposal the extra components/instruments they intend to use in order to complete the project

Topic#2: Low Voltage Motor Protection Simulator

Objective:

1. Build laboratory simulator for demonstration of all metering, control, disturbance and protection functions available in the TesysT

Proposal shall include:

1. Application examples from TesysT commissioning manuals
2. Innovative ideas to link the project to existing, experiments/equipment in the student's university lab
3. Photographs from student's university lab to demonstrate the innovative ideas this project can bring to enhance the educational topics
4. Demonstration how different measuring tools and lab instruments already existing in student's lab can be used in the experiment (Avometer, Digital power meters, oscilloscope etc....)

Available components:

1. TesysT
2. SoMove software

** Students must include in their proposal the extra components/instruments they intend to use in order to complete the project*

Topic#3: Medium Voltage Motor Protection Simulator

Objective:

1. Build laboratory simulator for demonstration of all metering, control, disturbance and protection functions available in the Sepam M41

Proposal shall include:

3. Application examples from Sepam M41 commissioning manuals
4. Innovative ideas to link the project to existing, experiments/equipment in the student's university lab
5. Photographs from student's university lab to demonstrate the innovative ideas this project can bring to enhance the educational topics
6. Demonstration how different measuring tools and lab instruments already existing in student's lab can be used in the experiment (Avometer, Digital power meters, oscilloscope etc....)

Available components:

1. Sepam Series M41
2. SFT2841
3. SFT2826
4. ACE949-2

** Students must include in their proposal the extra components/instruments they intend to use in order to complete the project*

Topic#4: Safety and Earthing

This project is not applicable to students in (Ain Shams university, Cairo university ,Zagzig University, and Helwan university) since these universities are already equipped with similar projects

When a current exceeding 30mA passes through a part of a human body, the person concerned is in danger if the current is not interrupted in a very short time. The protection of persons against electric shock in LV installations must be provided in conformity with appropriate national standards statutory regulations, codes of practice. Different earthing arrangements should be implemented to avoid such risks.

Objectives:

1. Build demonstration kit for different types of neutral earthing systems education including minimum following points
 - Illustrate the importance of Earthing arrangements.
 - Studying different types of earthing schemes.
 - Selection of residual current devices for earth fault protection.
 - Implementation of a pro type model for TT, TN and IT system.

Available components:

1. *residual current device 25A-30 ma*
2. *residual current device 25A-300 ma*
3. *Earth leakage module – Vigirex*
4. *Closed Toroid*
5. *Miniature circuit breaker*
6. *Shunt release*
7. *Push button*
8. *Illuminating switch*
9. *Vigilohm XM200*
10. *XD 301 Fixed locator*

* Students must include in their proposal the extra components/instruments they intend to use in order to complete the project

Topic#5: Design of Electrical network Distribution

Electricity Distribution Network graduation project is entirely devoted to the planning and design of modern distribution systems including computer-based planning.

Topics covered are Design, construction standards, implementations of international standards, network information systems, correct/safe work practices and improvement of distribution systems for future distribution engineers.

Basic Concepts behind distribution design & planning process will be discussed including: business requirements, project management, technical design, accurate system design procedures, physical planning, cost management.

Available components:

1. *Ecodial software*
2. *IDspec software*
3. *Schneider Electric online calculation tools*
4. *Electrical installation guide for LV& MV networks*
5. *Egyptian Electrical installation code*

Topic#6: Ecostruxure smart space lab

Whether in a single-family house or in an office complex, the demand for comfort and versatility in the management of air-conditioning, lighting and access control systems is growing. At the same time, the efficient use of energy is becoming increasingly important. More convenience and safety coupled with lower energy consumption can however only be achieved by intelligent control and monitoring of all products involved. This however implies more wiring, running from the sensors and actuators to the control and monitoring centers. Such a mass of wiring in turn means higher design and installation effort, increased fire risk and soaring costs.

To transfer control data to all building management components, a system is required that does away with the problems of isolated devices by ensuring that all components communicate via one common language: This is KNX Bus.

Objectives:

1. Construct smart home demonstration lab using KNX, CCTV, lighting control, HVACetc

Proposal shall include:

1. Different types of home loads
2. Integration with CCTV
3. Integration with smart home devices (ALEXA, Android or IOS voice activated applications)
4. Innovative ideas to help disabled people in smart homes

Available components:

1. *KNX Power supply*
2. *KNX blind actuator*
3. *Dimming actuator*
4. *USB interface*
5. *Switch actuator*
6. *Homelynk*
7. *KNX push buttons*
8. *Metering gateways*
9. *KNX binary input*
10. *eConfigure software*

** Students must include in their proposal the extra components/instruments they intend to use in order to complete the project*