

## **COLLEGE OF ENGINEERING**

### **Department OF Electrical Engineering**

#### **EngE... 590 – Senior Project (I)**

#### **(Capstone Design)**

#### **Proposal Procedure**

Proposals can be submitted by students, faculty or industry. The deadline for submission is First of September, and First of April. Each project will be completed under the supervision of one or more department or college staff members with expertise in the project area. Each student team will normally consist of Three to Four Department or college engineering seniors.

Each project must meet the following criteria:

1. Project can be completed during TWO semesters (ONE academic year.)
2. Project must meet ABET design criteria:
  - a) Open ended
  - b) Non-unique solutions
  - c) Student decisions required
  - d) Involve advanced engineering analysis
  - e) Design configuration decisions required
  - f) Visibility studies and market needs

The main emphasis of the project is design. If construction is involved it must not override the engineering design aspects of the project.

Each proposal should be outlined as listed below:

- A. Proposer's name, address, phone number and affiliation.
- B. Choice of faculty advisor if known.
- C. Number of students desired and student design team choice if known.
- D. Type of analysis that project may involve such as (Department specialties).....
- E. State tentative project name followed by a description of the project not more than one page in length.
- F. If the project is from industry please state what your company is willing to donate to the project to offset student travel, duplication expenses, etc. Estimated Budget around 5000 SR or budget accepted by the university

**The proposals will be reviewed by the department and confirmed by the Advisory Board. Students will be assigned to selected projects early at 10<sup>th</sup> September and April**

Please submit proposals with formal attached Form by Email to:

College Coordinator of Capstone Design

Dr. Refaat Khater

[ref\\_khater@yahoo.co.uk](mailto:ref_khater@yahoo.co.uk),

Department Coordinator of Capstone Design

Name: .....

Email: .....

**COLLEGE OF ENGINEERING**  
**Department OF Electrical Engineering**

**EngE 590 – Senior Project (I)**  
**(Capstone Design)**  
**Proposal Format**

<b>Academic year</b>	<b>1440 – 1441 - 2019 –2020</b>
<b>Semesters</b>	<b>Fall-springer</b>
<b>Academic Level</b>	<b>Nine / Ten</b>
<b>Project Title</b>	<b>Reactive power compensation in radial Distribution network</b>
<b>Supervisors</b>	<b>Dr. Ehab Salim</b>
<b>Number of Student Team</b>	<b>5</b>

**1- Introduction & Background**

In distribution networks, reactive power flows cause high voltage drop, power losses, and low power factor. These effects can be reduced by optimally installing of shunt capacitors. Compensation of reactive power presents the basic role in power system planning to provide compatible locations of the compensation apparatus to guarantee the minimum cost of compensation with suitable voltage profiles. In this project, the optimal allocations and sizing of capacitors in distribution systems are discussed. First the candidate buses for installing capacitors are suggested using loss Sensitivity factor. Then cost function is employed to deduce the locations of capacitors and their sizing from the elected buses. The results are introduced to verify the effectiveness of the suggested algorithm to enhance the voltage profiles for distribution system.

**2- Problem Statement and Objective(ABET – 3e)**

Problems are classified as follows: i) voltage control ii) LSF iii) Cost function iv) installation and operation cost. From the above problems, the students identify voltage profiles, costs and power factor to solve the above problems. In addition, the students can formulate and solve engineering problems appear during project.

**3- Problem justification and Outcomes(ABET - 3e)**

In this project, the students justified the engineering problems and formulate how to solve these problems. This project includes electrical design, stability, voltage profiles, power quality and compensation. The optimal location of capacitor is obtained using lsf. The total cost (installation, operation, ..) are calculated. Then the electrical performance of distribution system is illustrated like power factor and voltage regulation. Load flow analysis is introduced using toolbox in MATLAB.

#### **4- Literature Review (ABET – 3j)**

- i) Energy saving ii) Renewable energy iii) distribution system

#### **5- Problem Constraints (ABET - 3c)**

Problem constraints are: i) lower and upper voltage limits ii) Thermal limit iii) steady state stability limit iv) capacitor values.

#### **6- Design Approach and Methodology(ABET - 3a, 3b, 3e, 3k)**

- i) Knowledge of mathematic and engineering principles
- ii) Components to conduct design circuit and comparison with theoretical
- iii) Methods used to formulate and solve engineering problem
- iv) Using Matlab to solve engineering problems

#### **7- Tasks and Time Schedule**

**(Level: 9, First Term, 1437)**

Task No.	Task Name	Duration (Weeks)
1	Data collections	2
2	Distribution system	3
3	costs& compensation	2
4	Voltage profiles	2
5	Report & seminar	2

**(Level: 10, Second Term,1438 )**

Task No.	Task Name	Duration (Weeks)
1	Revision of the tasks on first semester	1
2	Prepare Matlab (load flow )	2
3	Prepare objective function	3
4	Analysis the data and comparison with other work	3
5	Discussion, conclusion and final report	2

#### **8- Budget & Expenditures Sheet**

Items	Description	Estimated Price
1	Matlab (available)	
2		
3		
4		

## 9- Visibility of the product and market needs (ABET -)

Connection with Ministry of electricity and industry of KSA

Supervisors	
Name	Signatures
Dr. Ehab Salim	



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## Senior Project (CapstoneDesign) Presentation

### *EngE 590 Case Study Presentations*

I have invited Guest lecturers and students to provide you with actual projects or situations for your review.

- Review your notes and presentation slides
- Study the information
- Use what you have learned in project class to identify various issues/topics of interest
  - Working in your teams, select one of the Guest Lecturer projects for review.
  - Please identify why you have selected the guest lecture or video for case study review.
  - Please identify the Engineering Challenges for the Case Study.
  - Review and discuss the project within the framework of the course topics including:
    - Need Identification and Problem Definition
    - Project Planning
    - Technological Innovation
    - Concept Generation and Evaluation
    - Legal and Ethical Issues

Your Case Study review should be between 8 to 10 minutes. Because of time constraints, I may cut off teams in excess of 10 minutes. Therefore please plan your time wisely.

You should prepare your presentation with PowerPoint and have a copy on a USB memory stick. Please do not show up with a floppy disk and expect to load onto the computer. Please be prepared to present at your selected time. If you have a significant delay in setting up that effect the timing of other presentation, your score will be deducted.

A good rule of thumb is one slide per minute. Therefore, I recommend that you limit to more than 12 slides.

### *Recommended Presentation Outline*

- Title Slide: Case Study Project,
- Team Members,
- Date
- Agenda – organization of the presentation materials
- Case Study Selection – Why you have chosen or selected this project for review
- Background – Provide summary or overview of the case study project
- Engineering or Technical Challenges – Identify the challenges as presented
- Case Study Review – Identify and discuss various course topics as they relate to the casestudy. You should be able to describe the Design Process or Methodology for your case.
- Summary/Conclusions, what is your outcomes, visibility, marketing
- References/Acknowledgements

***Your presentation will be assessed by the following criteria:***

- Organization and Style of Presentation
- Case Study Review – identification of topics, significance of review

***EngE 590 – Senior Project  
(Capstone Design)***

**Catalog Data: EngE 590 – Senior Project. (4:6,0)**

**Continuous Assessment two semesters ( Duration – 32 weeks )**

***Spring 2019-2020.***

***Department of:*** Electrical Engineering

***Senior Project Sign-Up Sheet***

***Project Title: Reactive power compensation in radial Distribution network***

***Project Advisor: \_\_\_\_\_ - Dr. Ehab salim***

Name

E-mail Address

Team

1	201310403	عبدالرحمن بن محمد بن عبد الله القحطاني	منتظم
2	201505441	يحيى محمد يحيى جدع	منتظم
3	201517942	معاد مبروك هادي بن صنه	منتظم
4	201601126	توفيق خالد يحيى المالكي	منتظم
5	201601155	عبدالرحمن عبدالله علي عتودي	منتظم

Please identify the everyday item that will be addressed by the design project.

Your team will also address the Case Study assignment.

Please identify a Team Leader to address communication responsibilities.

Team must have a minimum of 3 members and no more than 5 members.

***Signature***

(1) ..... (2) ..... (3) ..... (4) .....

*[This page must be signed and returned no later than the start of the 2<sup>nd</sup> Session. Students who are not comfortable signing this document should meet with the course coordinator before the third week of the semester to review the requirements as necessary.]*