**EE 441: Electric Energy Utilization**

**Required Course**

EE441: Electric Energy Utilization  
Credits 3.

**Introduction, Illumination:** Types of Lamps, Illumination schemes, Calculation of Illumination, Requirements of Proper Lighting.  
**Electric Heating:** Advantages of electric heating, Heating Methods, Design of resistance heating element,  
**Electric Welding:** Advantages of electric Welding, Welding methods, Comparison between AC and DC, Arc welding, Welding control circuits.  
**Electrolytic Processes:** Laws of electrolysis, Process of electro-deposition, Factors affecting electro-deposition, Manufacturing of chemicals by electrolysis process,  
**Refrigeration and Air Conditioning:** Principle of air conditioning, Refrigeration cycle, Eco-friendly refrigerants, Electrical circuits used in refrigerator and air-conditioner

**Catalog Data**

Prerequisite  
EE340

Class/Lab Schedule  
Three one-hour class sessions per week

Textbook  

References

1. To deliver the concept of illumination, electric heating and welding.
2. To explain the various types of illumination schemes
3. To describe the different types of traction systems, and electrolysis laws.
4. To deliver Design of resistance heating element.

Objectives

**Introduction, Illumination:** Types of Lamps, Illumination schemes, Calculation of Illumination, Requirements of Proper Lighting.  
**Electric Heating:** Advantages of electric heating, Heating Methods - Design of resistance heating element,  
**Electric Welding:** Advantages of electric heating, Welding methods, Comparison between AC and DC, Arc welding, Welding control circuits.  
**Electrolytic Processes:** Laws of electrolysis, Process of electro-deposition - Factors affecting electro-deposition - Manufacturing of chemicals by electrolysis process  
**Refrigeration and Air Conditioning:** Principle of air conditioning, Refrigeration cycle, Eco-friendly refrigerants, Electrical circuits used in refrigerator and air-conditioner

Course Learning Outcomes

1. Design various illumination schemes.
2. Compare AC and DC arc welding
3. Recognize different Electrolytic Processes
4. Design the resistance heating element.
   Develop the Electrical circuits used in refrigerator and air-conditioner
   Compare working of various electric traction systems.

| Relationship of the course to Electrical Engineering Program Outcomes |
|-------------------------------------------------|---|---|---|
| a. An ability to apply knowledge of mathematics, science, and engineering. | None | Low | High |
| b. An ability to design and conduct experiments, as well as to analyze and interpret data. | None | Low | High |
| c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. | None | Low | High |
| d. An ability to function on multi-disciplinary teams. | None | Low | High |
| e. An ability to identify, formulate, and solve engineering problems. | None | Low | High |
| f. An understanding of professional and ethical responsibility. | None | Low | High |
| g. An ability to communicate effectively. | None | Low | High |
| h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. | None | Low | High |
| i. A recognition of the need for, and an ability to engage in, life-long learning. | None | Low | High |
| j. A knowledge of contemporary issues | None | Low | High |
| k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. | None | Low | High |

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