

# Engineering Program

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| <b>Specialization</b>    | Electrical Installations and Equipment |
| <b>Course Number</b>     | 020304111                              |
| <b>Course Title</b>      | Electrical power systems               |
| <b>Credit Hours</b>      | 2                                      |
| <b>Theoretical Hours</b> | 2                                      |
| <b>Practical Hours</b>   | 0                                      |

**Brief Course Description:**

- ❖ Power generation plants, transformation stations, high voltage network, electrical distribution systems and their faults.

**Course Objectives:**

The student should be able to Understand the generation , transmission, and distribution of electrical energy

**Detailed Course Description:**

| <b>Unit Number</b> | <b>Unit name</b>                | <b>Unit Content</b>   | <b>Time Needed</b> |
|--------------------|---------------------------------|---|--------------------|
| <b>1.</b>          | <b>Introduction</b>             | Active, reactive, apparent power.<br>Power losses. Power factor   | 1 week             |
| <b>2.</b>          | <b>Power generation plants</b>  | Types of power generation plants:<br>1. Steam power plants<br>2. Gaseous power plants<br>3. Diesel power plants<br>4. Hydraulic power plants<br>5. Renewable power plants | 3 weeks            |
| <b>3</b>           | <b>transformation stations</b>  | Power transformers, winding arrangement, cooling, tap changer.<br>Main components   | 2 weeks            |
| <b>4</b>           | <b>high voltage network</b>     | Insulation material, gas, liquid, solid. Electrical field and breakdown voltage   | 2 weeks            |
| <b>5</b>           | <b>electrical distribution</b>  | Electrical substations, main components. Protection and control devices<br>Current transformers<br>Voltage transformers<br>Bus bars                                       | 3 weeks            |
| <b>6</b>           | <b>Faults in power systems.</b> | Types of faults<br>General protection   | 2 weeks            |
| <b>7</b>           | <b>Transmission lines</b>       | Overhead transmission lines<br>Equivalent circuits<br>High voltage cables   | 2 weeks            |

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□ **Evaluation Strategies:**

|          |              | Percentage | Date       |
|----------|--------------|------------|------------|
| 1. Exams | Midterm Exam | 40%        | --/--/---- |
|          | Assignments  | 10%        |            |
|          | Final Exam   | 50%        | --/--/---- |

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□ **Teaching Methodology:**

1. Lecture

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□ **Textbook:**

Kirtley, James. Electric Power Principles: Sources, Conversion, Distribution and Use. Wiley, 2010. ISBN: 9780470686362.

**References:**

1. Electric Power Systems: A Conceptual Introduction by Alexandra von Meier

2. Power Generation, Operation, and Control by Allen J. Wood Hardcover