Course Title	Electrical Energy: Generation, transport and distribution				
Course Code	ECE480				
Course Type	Compulsory				
Level	Bachelor (1st Cycle)				
Year / Semester	4th Year / 8th Semester				
Teacher's Name	TBA				
ECTS	6	Lectures / week	3 hours / 14 weeks	Laboratories / week	N/A
Course Purpose and Objectives	The objective of this course is to expose students to the processes and components behind electrical power generation, transmission and distribution. Students develop skills and learn to apply electrical circuit calculations involving single- and three-phase systems as well as phasors, real and reactive power and transmission line models for electric transmission systems.				
Learning Outcomes	Upon successful completion of this course, students should be able to: • Explain the fundamental principles of electrical power generation, transmission, distribution and utilization • Identify the devices and technologies used in the generation of electrical energy • Define the devices and mechanisms used to transform electrical power • Assess the transmission of energy over the power system to the point of utilisation				
Prerequisites	ECE320	Co-requisites	None		
Course Content	Power systems: Introduction to electric power systems. The structure of a power system. Basic principles of generation, transmission and distribution of electrical energy. Basics of electric energy system: Concepts of power in alternating current systems. Real, reactive, apparent power and power factor in AC circuits. Single and three phase circuits. The per-unit system, objective and choice of basic quantities. Voltages and currents in three-phase circuits (Wye and Delta connections). Power generation: Introduction to power generation. Electric power generation: Non-conventional methods (hydroelectric, wind and solar energy). Electric power generation: Conventional methods. The synchronous machine overview (fields of the synchronous machine, equivalent circuit, steady-state				

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<tr><td></td><td>characteristics, power angle etc). Thermal generating power plants and distributed utilities.

Electric power transmission:

Introduction to energy transmission. Transmission line structure. Electric transmission line parameters (line inductance and capacitance, two-port networks. transmission line models). Sag and tension of conductor. Environmental impact of transmission lines.

Electric power distribution:

Overview of distribution configurations. Power system loads. Voltage levels and distribution substations. Transformers. Overhead and underground distribution. Power system operation and control.

Power utilisation:

Metering and electrical energy consumption. Overview of electrical power utilisation.</td></tr>
<tr><td>Teaching Methodology</td><td>Face- to- face</td></tr>
<tr><td>Bibliography</td><td>L.L Grigsby, Electric Power Generation, Transmission, and Distribution, CRC Press

E. Hughes, J. Hiley, K. Brown and I. Mc-Kenzie-Smith, Electrical and Electronic Technology, Prentice Hall

T. Gonen,Electric Power Distribution Engineering,CRC Press

Momoh J. A., Electric Power Distribution, Automation, Protection, and Control, CRC Press</td></tr>
<tr><td>Assessment</td><td><table><tr><td>Examinations</td><td>70%</td></tr><tr><td>Assignments/Lab</td><td>20%</td></tr><tr><td>Class Participation and Attendance</td><td>10%</td></tr><tr><td></td><td>100%</td></tr></table></td></tr>
<tr><td>Language</td><td>English</td></tr>
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