Course Title: Power Apparatus and Systems
Course Code: EPEG 301
Credit Hours: 3

Course Description:
This course is to provide the students with an overview of Electric Power System, power system protection apparatus and their use. The course also imparts the basic concepts of residential and industrial electrification as well as power supplies required for electronics and communication equipments

Course Contents:

Unit 1: Introduction to Power Systems
History of Electrical Power System, Basic structure of power system, Overview of Interconnected Nepalese Power System

Unit 2: Generation of Electrical Power
Thermal Power Plant, Hydro Power Plant, Nuclear Power Plants, Solar Photovoltaic System, Wind Energy Conversion Systems, Tidal power plant, Geothermal power plants, Fuel Cells, Energy Storage Systems

Unit 3: Transmission and Distribution of Electrical Power
Electric supply system, various systems of power transmission, economic choice of conductor size, economic choice of transmission voltage, mechanical design of over head lines: conductor materials, line supports, Insulators, corona, right of way, distribution systems, classification of distribution systems, load curve and load duration curve, load factor, demand factor, connection schemes of distribution systems, interference between power and communication lines, power line carrier communication

Unit 4: Protection and Control of Electrical Power System
Principles of power system protection, fuse and its operation, Miniature Circuit Breaker and its operation, Power circuit breaker operation and types, relays and their types, Protection schemes for generators, transformers and transmission lines, earthing for electrical system, surge protection device, Control of Electrical Power System, blackouts and load shedding, Supervisory Control and Data Acquisition System , Energy Management System, Smart Grid

Unit 5: Residential and Industrial Electrification
Service mains, types of distribution systems in buildings, Types of electrical wiring, Electrical layout drawing, load estimation and distribution board plan for a residential building, types of industrial load and their power supply requirements, tariffs, electrical energy conservation in buildings and industries

Unit 6: Power Supply for electronics and communication equipments
Thyristor, Silicon Controller Rectifier, Diac, triac, Uninterrupted Power Supply, Switched Mode Power Supply, Dc-dc converter, Inverter, backup power supply for communication equipments and repeater stations: diesel generator, hybrid electrical power system

References:

1. Asfaq Husain, *Electrical Power Systems*, Dhanpat Rai & Co.
2. V.K. Mehta, *Principles of Power Systems*, S. Chand Co.
3. K.B. Raina and S.K. Bhattacharya, Electrical Design Estimating and Costing, New Age International (P) Limited
4. M.H. Rashid, *Power Electronics Circuits, Devices and Applications*, Prentice Hall Inc.

Evaluation:

In-Semester Evaluation: 50%
End-Semester Evaluation: 50%