

Maulana Abul Kalam Azad University of Technology, West Bengal

(Formerly West Bengal University of Technology)

Syllabus for B. Tech in Electrical Engineering

(Applicable from the academic session 2018-2019)

Name of the course	POWER SYSTEM-I
Course Code: PC-EE-502	Semester: 5th
Duration: 6 months	Maximum Marks: 100
Teaching Scheme	Examination Scheme
Theory: 3 hrs/week	Mid Semester Exam: 15 Marks
Tutorial: 0hr/week	Assignment & Quiz: 10 Marks
Practical: hrs/week	Attendance: 05 Marks
Credit Points: 3	End Semester Exam: 70 Marks

Objective:

1. To understand the basic principle of generation of Electricity from different sources
2. To find parameters and characteristics of overhead transmission lines and cables.
3. To find different parameters for the construction of overhead transmission line
4. To determine the performance of transmission lines.
5. To understand the principle tariff calculation.
6. To solve numerical problems on the topics studied.

Pre-Requisite

1. Basic Electrical Engineering (ES-EE-101)
2. Electric Circuit Theory (PC-EE-301)
3. Electromagnetic field theory (PC-EE-303)

Unit	Content	Hrs	Marks
1	<p>Basic Concepts: Evolution of Power System and present day Scenario. Structure of power system: Bulk power grid and Micro Grid.</p> <p>Generation of Electric Power: General layout of a typical coal fired power station, Hydro electric power station, Nuclear power station, their components and working principles, comparison of different methods of power generation. Introduction to Solar & Wind energy system.</p> <p>Indian Electricity Rule-1956: General Introduction.</p>	10	
2	<p>Overhead transmission line: Choice of frequency, Choice of voltage, Types of conductors, Inductance and Capacitance of a single phase and three phase symmetrical and unsymmetrical configurations. Bundle conductors. Transposition. Concept of GMD and GMR. Influence of earth on conductor capacitance.</p> <p>Overhead line construction: Line supports, Towers, Poles, Sag, Tension and Clearance, Effect of Wind and Ice on Sag. Dampers.</p> <p>Corona: Principle of Corona formation, Critical disruptive voltage, Visual critical corona discharge potential, Corona loss, advantages & disadvantages of Corona. Methods of reduction of Corona.</p>	12	
3	<p>Insulators: Types, Voltage distribution across a suspension insulator string, String efficiency, Arching shield & rings, Methods of improving voltage distribution across Insulator strings, Electrical tests on line Insulators.</p>	05	

4	Cables: Types of cables, cable components, capacitance of single core & 3 core cables, dielectric stress, optimum cable thickness, grading, dielectric loss and loss angle.	04	
5	Performance of lines: Short, medium (nominal, T) and long lines and their representation. A.B.C.D constants, Voltage regulation, Ferranti effect, Power equations and line compensation, Power Circle diagrams.	06	
6	Tariff: Guiding principle of Tariff, different types of tariff.	03	

Text book:

1. Electrical Power System, Subir Roy, Prentice Hall
2. Power System Engineering, Nagrath & Kothery, TMH
3. Elements of power system analysis, C.L. Wodhwa, New Age International.
4. Electrical Power System, Ashfaq Hussain, CBS Publishers & Distributors

Reference books

1. Electric Power transmission & Distribution, S.Sivanagaraju, S.Satyanarayana,, Pearson Education.
2. A Text book on Power system Engineering, Soni, Gupta, Bhatnagar & Chakrabarti, Dhanpat Rai & Co.
3. Electric Power distribution system Engineering, 2nd Edition, T. Gonen, CRC Press.
4. www.powermin.nic.in/acts_notification/pdf/ier1956.pdf

Course Outcome:

After completion of this course, the learners will be able to

1. explain the principle of generation of Electric power from different sources
2. determine parameters of transmission lines and its performance
3. explain the principle of formation of corona and methods of its reduction
4. conduct electrical tests on insulators
5. solve numerical problems related to overhead transmission line, cable, insulators and tariff
6. analyze overhead transmission line based on short medium and long lines.

Special Remarks (if any)

The above-mentioned outcomes are not limited. Institute may redefine outcomes based their program educational objective.