

Introduction to Electric Systems

Course Code: EE 111

Department: Electrical Engineering

Instructor Name: B.G. Fernandes

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OVERVIEW

1. Passive Components, Signal Sources, KCL, KVL, Network Theorems.
2. Time domain response of Simple RC, RL circuits.
3. Sinusoidal steady state analysis of electrical circuits, Frequency Response.
4. Balanced three phase circuits.
5. Mutually coupled circuits.
6. Magnetic Circuits.
7. Transformers.



8. D.C. Machines.

9. Induction Machines.

10. Synchronous Machines.

11. Stepper motors.

12. Ratings of generators, motors and transformers,
motor applications.

13. Industrial power distribution, protection
& safety.



Reference Books:

A) Text reading

- i. Vincent Del Toro, “Electrical Engineering Fundamentals – Second Edition”, Prentice Hall 1989.
- ii. P. C. Sen, “Principles of Electrical Machines & Power Electronics”, John Wiley & Sons.

Ralph J. Smith, “Circuits Devices & Systems”, John Wiley & Sons.

- iii. I.J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill.



B) General reading (for Sr. No. 1,12,13)

- i. K Chen, “Industrial Power Distribution and Illuminating Systems”.
- ii. Donald Beeman, “Industrial Power Systems Hand book”.
- iii. Fink and Beaty, “Electrical Engineering Handbook” or any other author



Marks Distribution(Tentative):

First mid-semester exam	30%
End Semester exam	50%
Quiz	10%
Home assignments + attendance	10%



Notes:

1. Home assignments will be normally distributed on Friday and are required to be submitted on Wednesday. The difficulties in the assignments could be discussed with the instructor.
2. There will be 3 quizzes and the dates will be announced in class (There may be surprise quizzes). There will be no make-up for the quizzes.



“It is essential that a student acquire an understanding of and a lively feeling of values. He must acquire a vivid sense of the beautiful and morally good. Otherwise he with his specialized knowledge more resembles a well trained than a harmoniously developed person.”

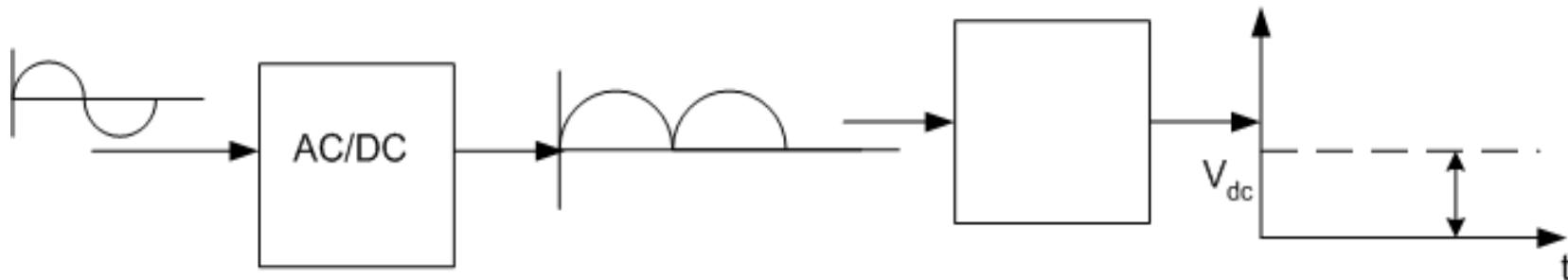
Albert Einstein



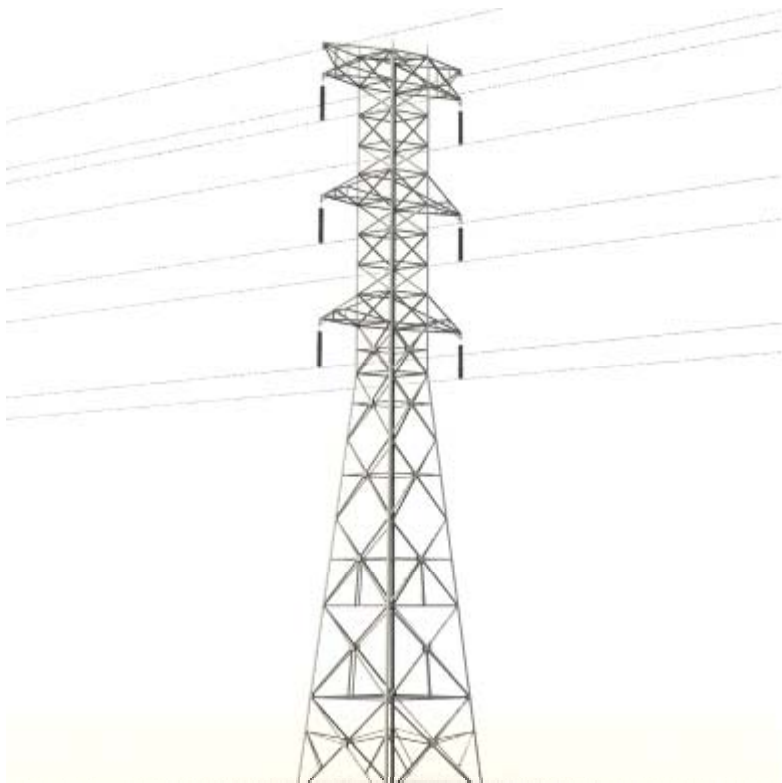
Motivation:

- Mobile Charger

⇒ Input is A.C & output is LOW VOLTAGE D.C



- Power Generation \Rightarrow Remote Places
Consumption \Rightarrow Urban areas



Power Scenario in India:

- Installed Capacity: 1,40,000 MW

- Peak power deficit: 17%

- Generation:

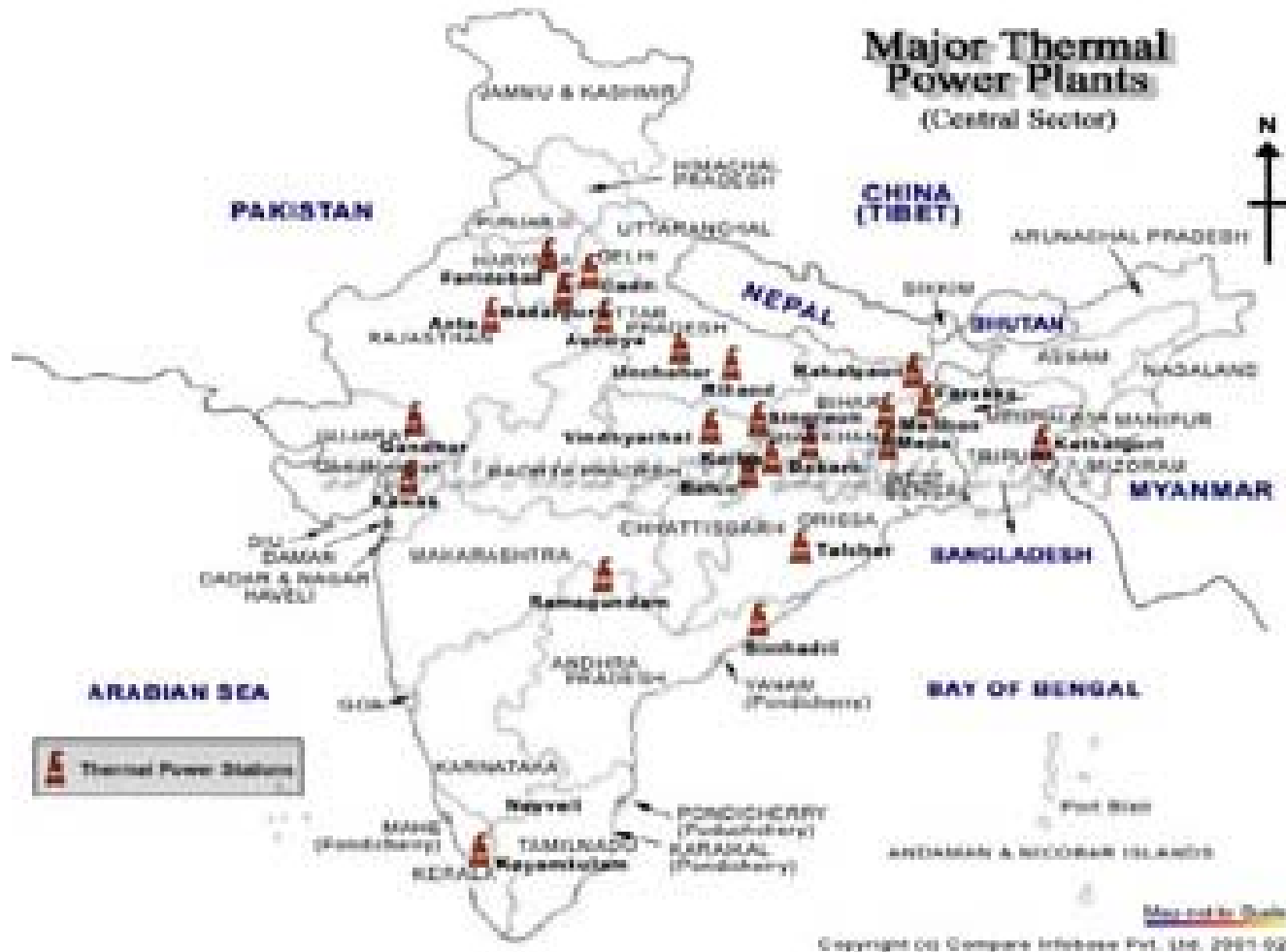
Thermal \Rightarrow 63%

Hydro \Rightarrow 25%

Renewable \Rightarrow 7.7%

Nuclear \Rightarrow 2.9%





Thermal power plants in India

Courtesy: Mapsofindia.com





Hydro power plants in India

Courtesy: Mapsofindia.com





Nuclear Power plants in India

Courtesy: International Nuclear safety center



- Generators at Mumbai & at North East run same speed !.
- Generators at Mumbai & at Karwar(Karnataka) may not run at same speed
- Which generator to be used for power generation from wind?
- For low power applications - Robotics, printers – rotation is in discrete steps

