Introduction to Electrical & Electronics Circuits

Course Code: EE 101
Department: Electrical Engineering

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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. Functional characteristics of diode, BJT, Op-amp
11. Analog circuit examples: rectifiers, amplifiers, oscillators etc
12. Digital circuits: AND/OR gates, flip-flops, DAC/ADC etc.

Reference Books:

A) Text reading

i. Vincent Del Toro, “Electrical Engineering Fundamentals – Second Edition”, Prentice Hall 1989.

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

iii. L.S.Bobrow, Fundamentals of Electrical Engineering, 2nd edition, Oxford University press, 1996.

iv. A.S.Sedra, and K.C.Smith, ‘Microelectronic Circuits’, [illegible] University [illegible]

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 Tuesday and are required to be submitted on Friday. The difficulties in the assignments could be discussed with the instructor/tutor.

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.

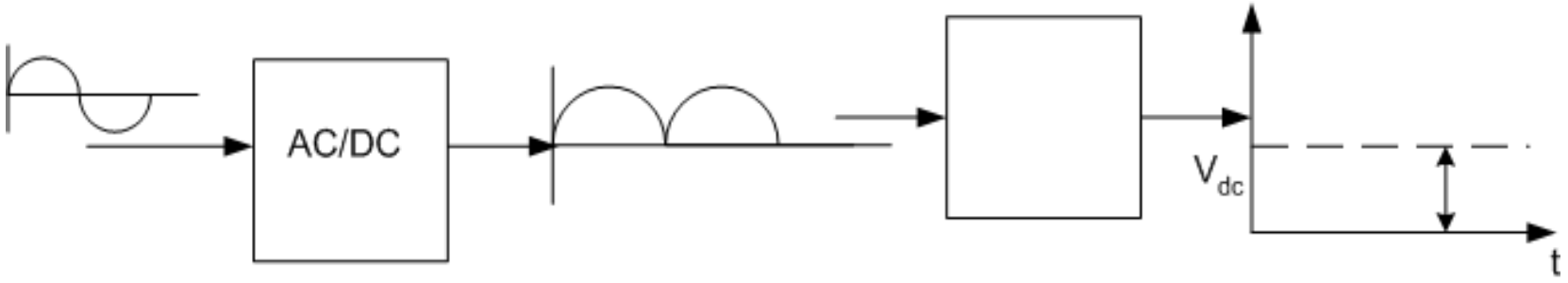
"It is essential that a student acquire an understanding of and a lively felling of values. He must acquire a vivid sense of the beautiful and morally good. Otherwise he with his specialized knowledge more resembles a well trained .... than a harmoniously developed person."

Albert Einstein

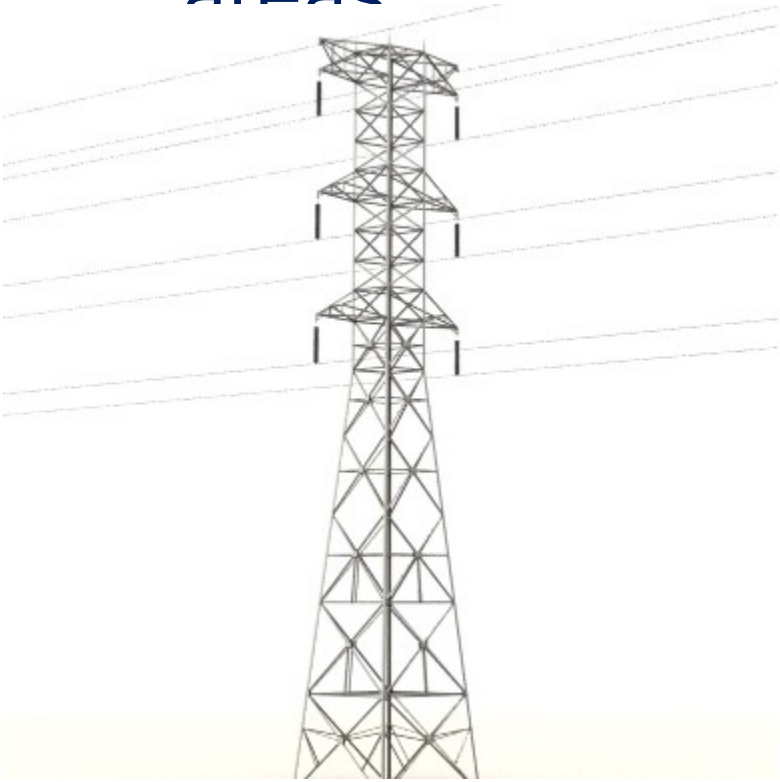
Motivation:

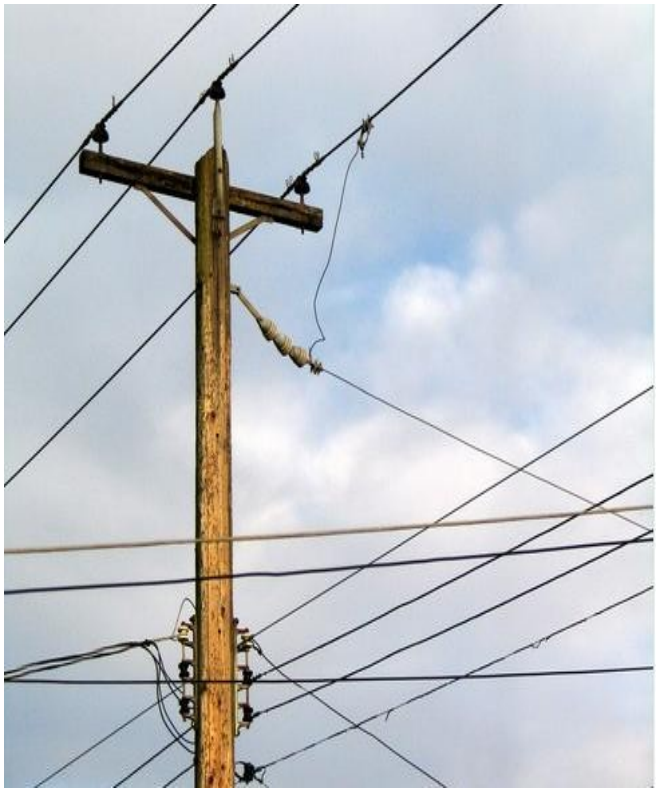
- Mobile Charger

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



- Power Generation ⇒ Remote Places ⇒ Consumption ⇒ Urban areas



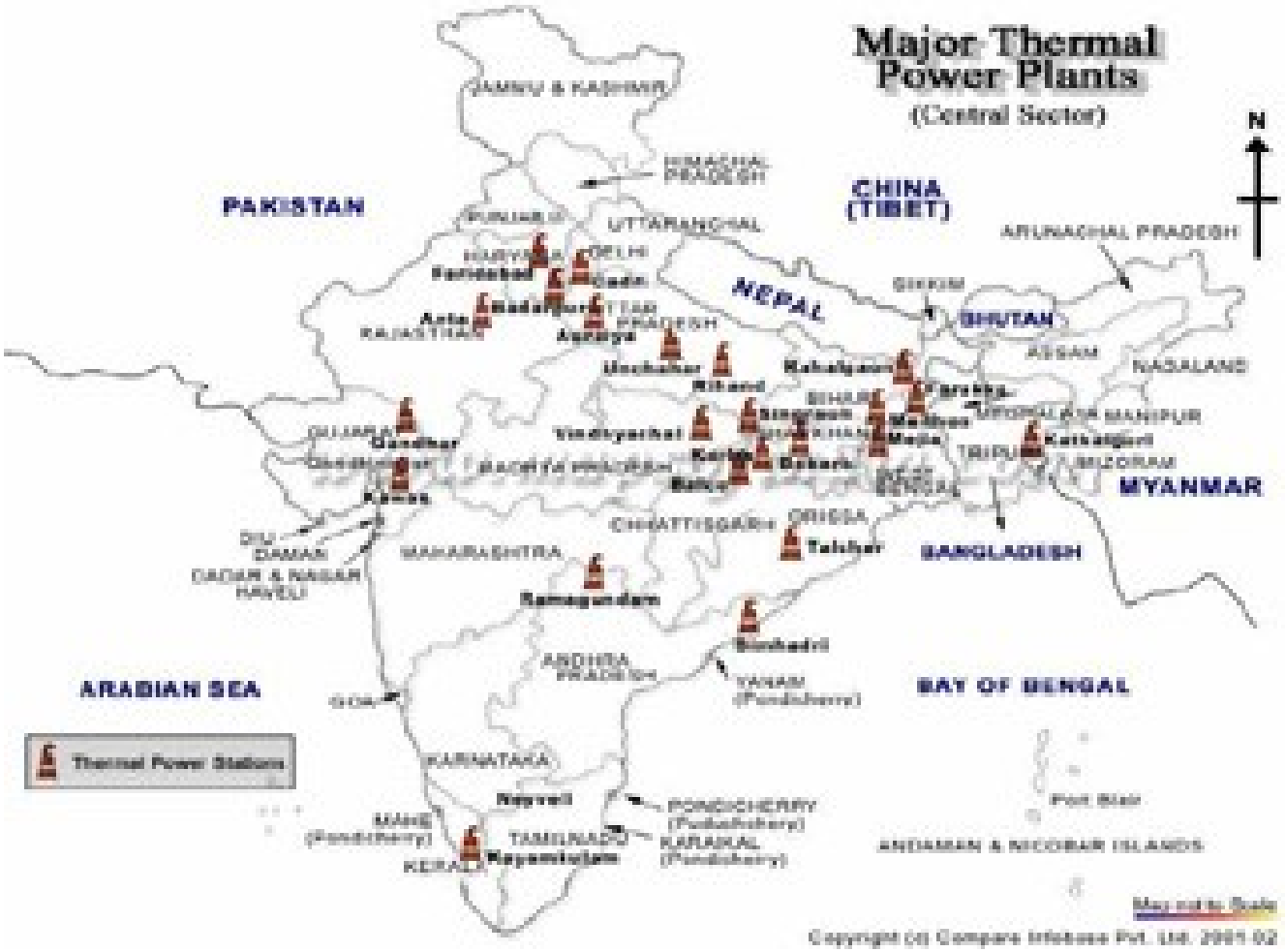


Power Scenario in India:

- Installed Capacity: 1,40,000 MW

  - Peak power deficit: 17%
  - Generation:

Thermal	63%
Hydro	25%
Renewable	7.7%
Nuclear	2.9%



Thermal power plants in India

Courtesy: Mapsofindia.com

Hydro power plants in India

Courtesy: Maps of India.com

Nuclear Power plants in India

Courtesy: http://www.mapsofindia.com/maps/india/nuclearpowerplants.htm#

- 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