



# **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## **DEPARTMENT OF COMPUTER SCIENCE AND DESIGN**

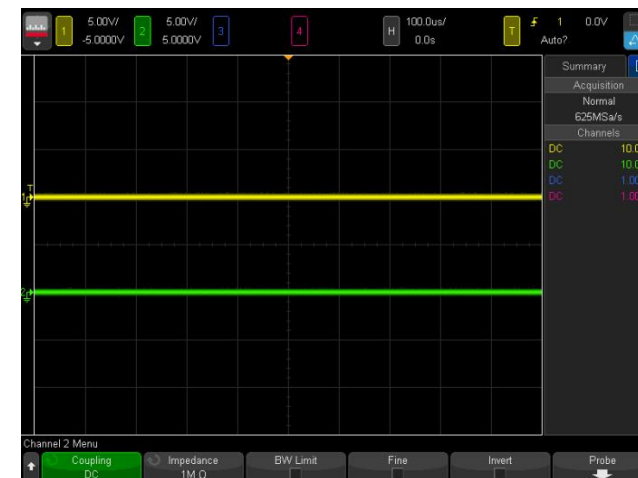
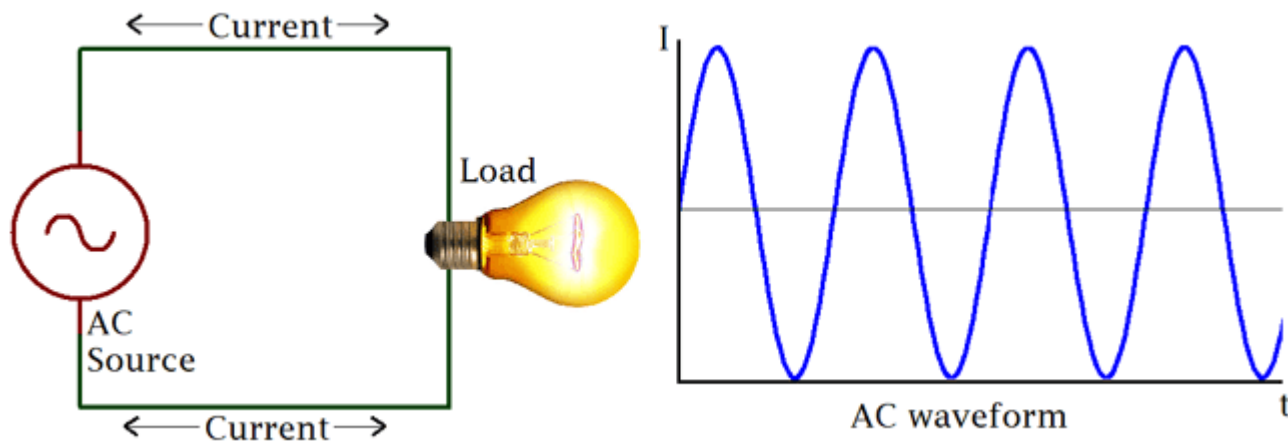
**COURSE NAME : 19EE01 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

I YEAR /II SEMESTER - COMPUTER SCIENCE AND DESIGN

Unit 1 – Electrical Circuits and Measurements

Topic 5 : Introduction to AC Circuits - Peak value and RMS values– Power and Power factor

# INTRODUCTION TO AC CIRCUIT

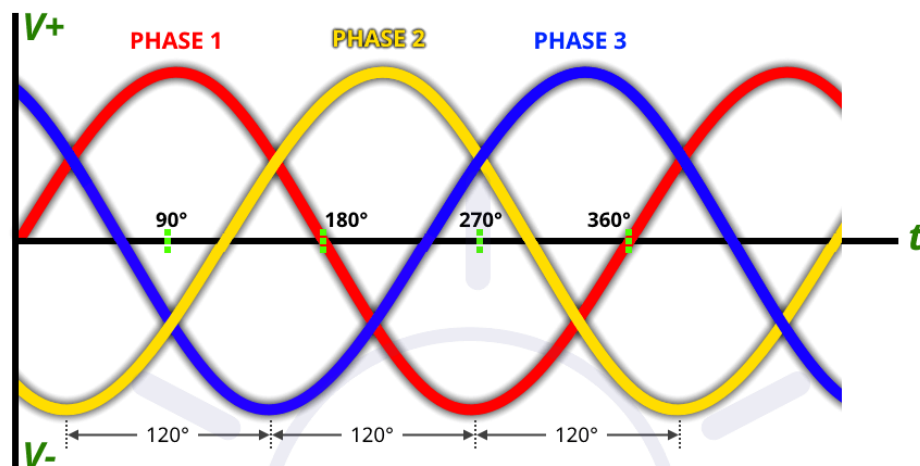


DC Waveform



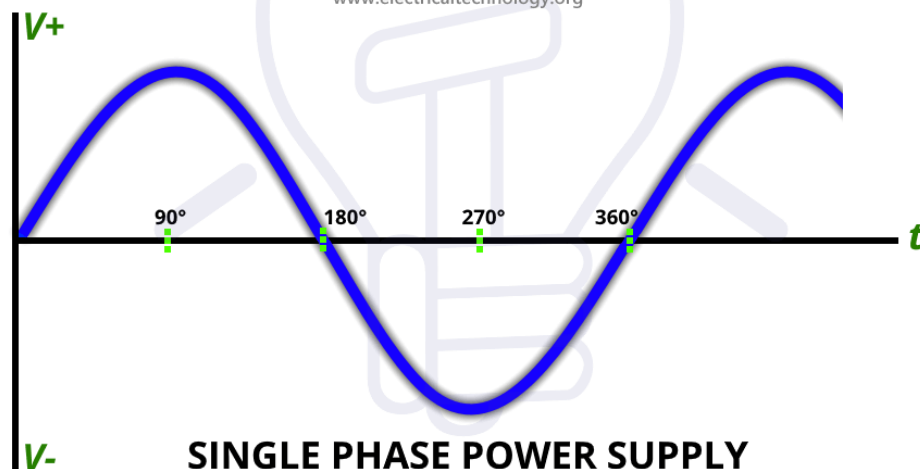
CRO-Cathode Ray Oscilloscope

# 3 PHASE Vs 1 PHASE SUPPLY



**3-PHASE POWER SUPPLY**

[www.electricaltechnology.org](http://www.electricaltechnology.org)



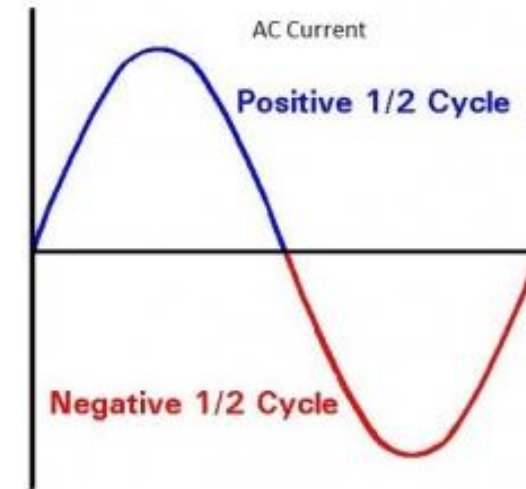
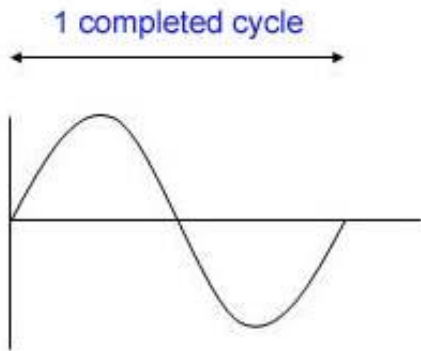
**SINGLE PHASE POWER SUPPLY**

3 Phases (R,Y,B)- Each phase carry voltage & Neutral

Neutral-Return Path

1 Phase- Phase & Neutral

# FREQUENCY IN AC



$$\text{Frequency, } (f) = \frac{1}{\text{Periodic Time}} = \frac{1}{T} \text{ Hertz}$$

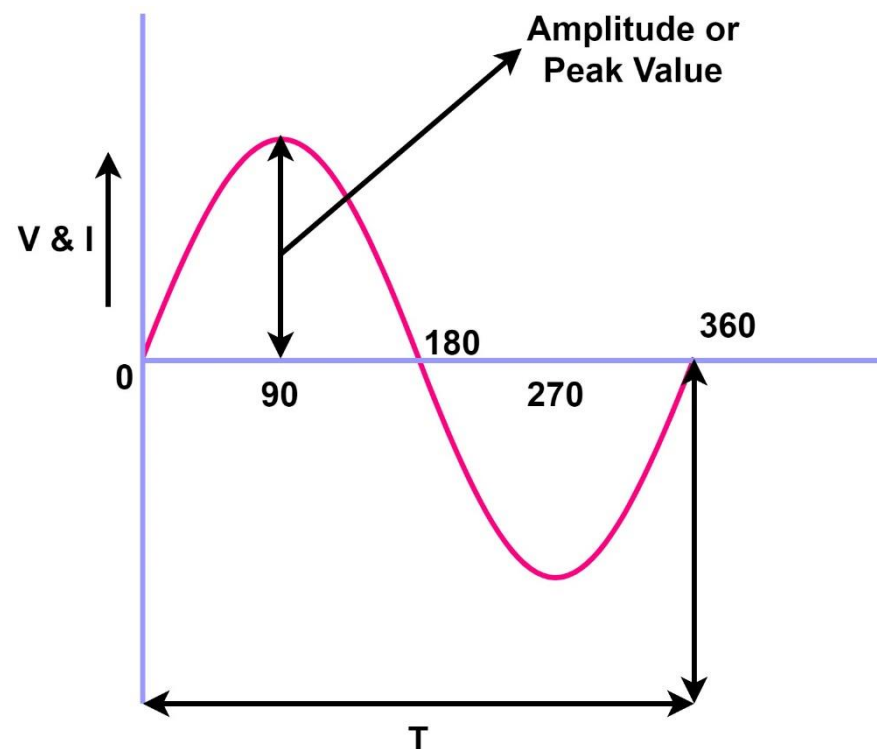
or

$$\text{Periodic Time, } (T) = \frac{1}{\text{Frequency}} = \frac{1}{f} \text{ seconds}$$



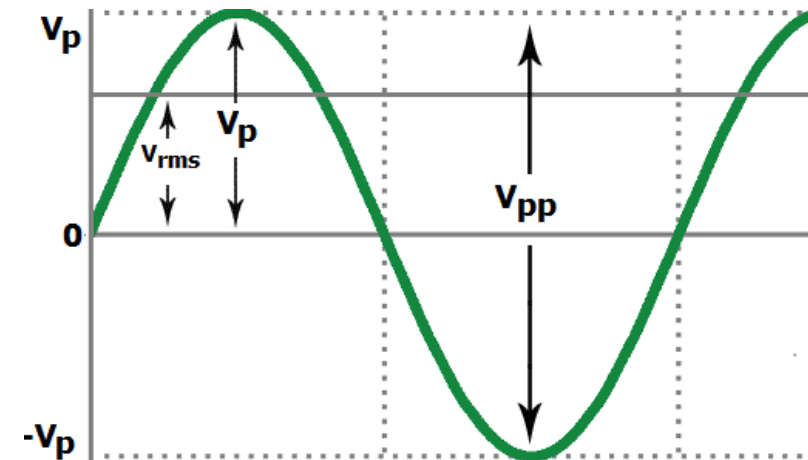
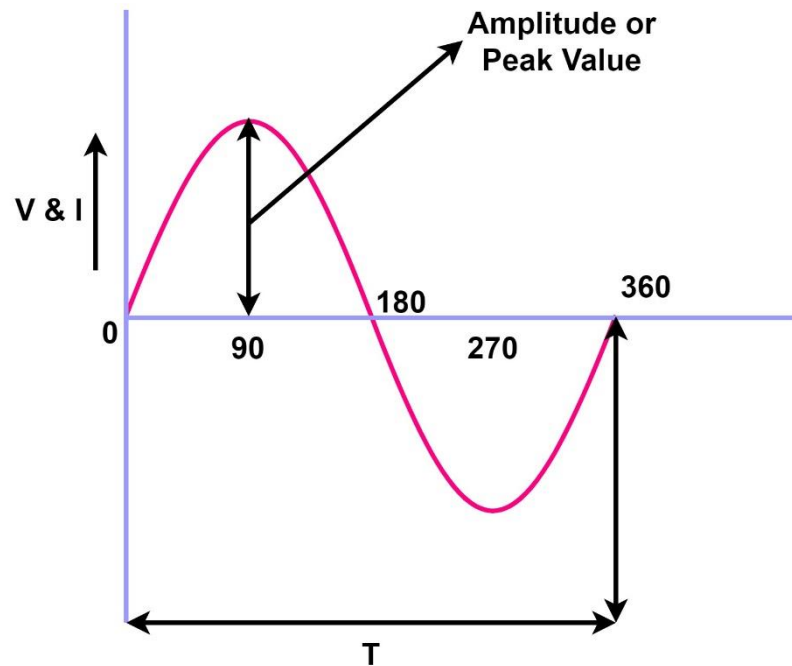
# PEAK VALUE OR MAXIMUM VALUE

The **maximum value** attained by an alternating quantity during one cycle is called its **Peak value**. It is also known as the **maximum value** or amplitude or crest value.



# RMS OF AC LINE

The RMS value is the effective value of a varying voltage or current.



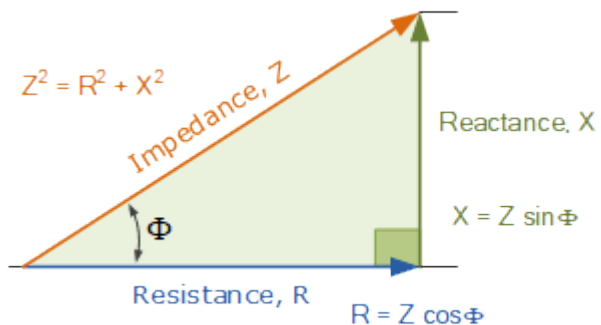
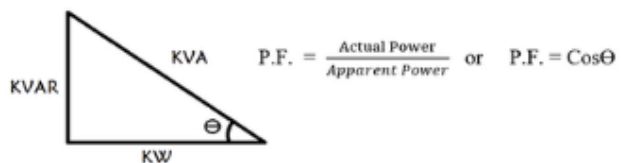
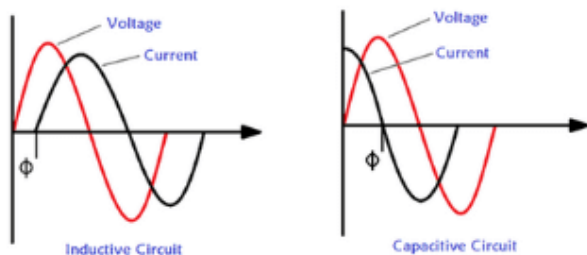
$$V_{rms} = \frac{1}{\sqrt{2}} * V_p = 0.7071 * V_p$$

$$V_{rms} = \frac{1}{2\sqrt{2}} * V_{pp} = 0.35355 * V_{pp}$$

$$V_{rms} = \frac{\pi}{2\sqrt{2}} * V_{avg} = 1.1107 * V_{avg}$$

# POWER FACTOR

## What is Power Factor?



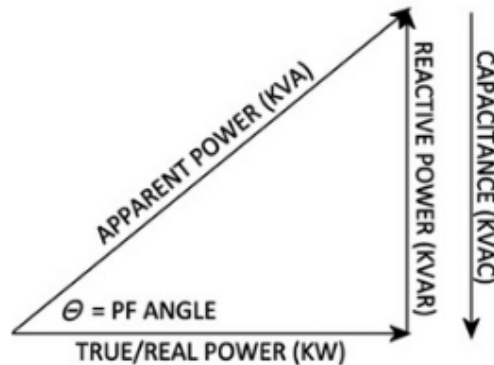
$$Z^2 = R^2 + jX^2 (\Omega)$$

$$\cos \Phi = \frac{R}{Z}$$

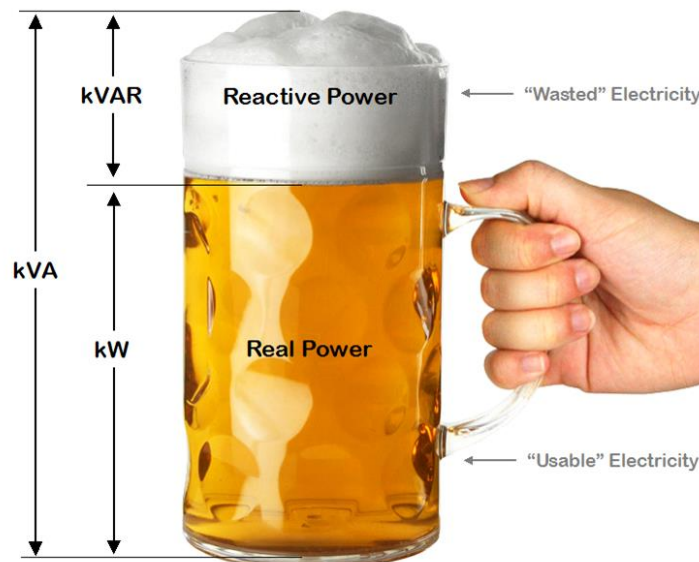
$$\sin \Phi = \frac{X}{Z}$$

$$\tan \Phi = \frac{X}{R}$$

$$\text{Power Factor} = \frac{\text{Real Power}}{\text{Apparent Power}}$$



Power factor of an AC power system is defined as the ratio of the real power absorbed by the load to the apparent power flowing in the circuit







# AC POWER

<b>Power Formulas in Single Phase AC Circuits</b>	$P = V \times I \times \cos \Phi$ $P = I^2 \times R \times \cos \Phi$ $P = V^2 / R (\cos \Phi)$
<b>Power Formulas in Three Phase AC Circuits</b>	$P = \sqrt{3} \times V_L \times I_L \times \cos \Phi$ $P = 3 \times V_{Ph} \times I_{Ph} \times \cos \Phi$ $P = 3 \times I^2 \times R \times \cos \Phi$ $P = 3 (V^2 / R) \times \cos \Phi$

Different Forms of Power  
Formulas in AC Circuit





# REFERENCES

1. Bhattacharya. S.K, “Basic Electrical and Electronics Engineering”, Pearson Education , (2017)
2. Muthu Subramanian R, Salivahanan S,“ Basic Electrical and Electronics Engineering”, Tata McGraw Hill Publishers, (2009)
3. V.Mittle“ Basic Electrical Engineering”, Tata McGraw Hill Publishers, (2017)
4. Nagrath. I.J, “Electronics: Analog and Digital”, Prentice Hall India Pvt. Ltd., (2013)

## THANK YOU