|  |
| --- |
| **CMGT 235 – Electrical and Mechanical Systems** |
| **Electrical Equations** | **Unit 3 - Electrical Systems** | **Fall 2022** |

|  |  |
| --- | --- |
| **Ohm’s Law – Watt’s Law**A close up of a clock  Description automatically generated**A close up of a sign  Description automatically generated A picture containing object  Description automatically generated** | **Power Factor**A close up of a logo  Description automatically generatedƟ**PF =****Real Power (KW)****Apparent Power (kVA)****Cos θ = PF****kVAR****kW****Tan θ =**  |

|  |  |
| --- | --- |
| **Resistors in series** | **Resistors in parallel** |

**AC Circuits**

**Single-Phase AC**

The Watt’s Law formulas for DC circuits also apply to single-phase (1ϕ) AC circuits containing only resistance.

If inductance or capacitive reactance puts the circuit out of phase, the power factor must be added to the basic power formula: **P = I x E x PF**

**Three-Phase AC**

The formula for a three-phase (3ϕ) system includes another term called the “three-phase factor”, which is a constant equal to the square root of 3, or 1.73. **P3ϕ = I x E x PF x 1.73**

**Transformer**

|  |  |
| --- | --- |
|  |  |

**Reactance Formulas**

**Inductor**

XL = 2Π f L (Ω) Where L is in Henrys

**Capacitor**

XC = 1 / 2Π f C (Ω) Where C is in Farads

**Impedance Formula**

Z = R2 + (XL – XC)2 in Ohms (for series circuit)