**Topic 2A: Install and Configure Power Supplies and Cooling Notes:**

**Power Supply Unit:**

**Power Supply Unit:** Supplies power to all components in PC by converting AC to DC current. Has several components like **rectifiers** that convert AC to DC, **transformers** that reduce voltage levels to lower levels, and **filters and regulators** that ensures stable output.

**Fan:** Another component inside PSU which is responsible for dissipating heat that is generated during power transmission. **Form factor** defines compatibility with motherboards and cases.

**Low-Line Voltages:** Mostly in NA regions with 120 VAC.

**High-Line Voltages:** Mostly in Europe/UK, and Asia with 230 VAC.

**Wattage Ratings:** The wattage rating determines how much power a PSU can provide to all the components in PC. Power = V x I. Modern desktop PCs has Wattage Ratings 200-300watts, servers has 300+ and gaming PCs has 500+ wattage ratings. Power Requirements can be calculated in websites like OuterVision Power Calculator.

**Rails:** Each wire that supplies power to components are called rails. **High-speed GPUs and CPUs** rely heavily on **+12V rails** whereas other **peripheral** relies on **+5V and +3.3V** rails.

**Power Supply Connectors:** **20pin** is old and **24pin** is new.

**Modular Power Supplies:** Lets you remove unused cables from the PSU.

**Redundant Power Supplies:** Two PSUs, where one is **active** and other is **backup**. **And hot-swappable** means when one is **failed**, other can be **used without shutting down** the system.

**Fan Cooling Systems:**

**Heat Sinks and Fan:** These are placed on top of CPUs. Heat sink is made of metal like copper or aluminum. Thermal paste is used between heat sink and CPU chip to help heat transfer better.

**Fan:** Thermometer sensors are used to adjust fan speed and detect failures.

**Liquid Cooling Systems:** Used in high-performance PCs like gaming PCs to manage heat better than fans. Two types: **Open loop** for entire components and **Closed loop** for CPUs or GPUs only which is pre-built.