EE 302
Electronic Equipment Repair

1.0 Safety and Hand tools

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Safety and laboratory procedure

Flash back

- Basic Electrical Theory
  - Voltage [driving force] causes current to flow
    - AC / DC - from safety perspective - negligible difference
    - Single Phase / Three Phase.

- Circuit / loop is necessary for current to flow
  - a start point - a route - an end point

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Safety and laboratory procedure

Flash back

- Voltage, Current and Resistance
  - Voltage increases => Current increases
  - Resistance decreases => Current increases

Voltage = Current / Resistance - Ohms Law

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Safety and laboratory procedure

- **Inside the Laboratory**
  - Location of first-aid kits
  - Location of emergency switches
  - Location of Fire alarm switches
  - Location of Fire extinguishers
  - Location of EXIT door

- **Students in Electrical laboratory**
  - Attire
    - Jacket, Pants, Rubber Shoes, safety boots
    - Hair (Woman-tied properly)
    - Use of metallic jewelry (e.g. Including Watches, Ring, bracelet and necklace)
  - Attitude in laboratory

- **Laboratory cleanliness**

- **Electrical hazard safety awareness when working with bare/expose live parts.**

- **Safety awareness between lecturer and students.**

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Handtools

- **Long nose pliers**
  - (Also known as Needle-nose pliers, pinch-nose pliers, or snipe-nose pliers) are both cutting and gripping pliers used by electricians and other tradesmen to bend, re-position and cut wire.
  - Given their long shape, they are useful for reaching into cavities where cables (or other materials) have become stuck or unreachable to fingers or other means.

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Handtools

- **Side cutter**
  - The handles of diagonal cutting pliers are commonly insulated with a dip-type or shrink fit electrically-insulating material for comfort and some protection against electric shock.
  - For electronics work, special diagonal cutters that are ground flush to the apex of the cutting edge on one side of the jaws are often used. These flush-cutting pliers allow wires to be trimmed flush or nearly flush to a solder joint, avoiding the sharp tip left by symmetrical diagonal cutters.
  - Instead of using a shearing action as with scissors, they cut by indenting and wedging the wire apart. The jaw edges are ground to a symmetrical "V" shape; thus the two jaws can be visualized to form the letter "X", as seen end-on when fully occluded.

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**Handtools**

- **Tweezers**
  - tools used for picking up and manipulating objects too small to be easily handled with the human hands.
  - scissors-like pliers used to grab objects.
  - Some tweezers have a long needle-like tip which may be useful for reaching into small crevices.
  - Triangular tip tweezers have larger, wider tips useful for gripping larger objects. Tweezers with curved tips also exist, sometimes called bent forceps.
Handtools

**Manual Wire stripper**
- A simple manual wire stripper is a pair of opposing blades much like scissors or wire cutters. The addition of a center notch makes it easier to cut the insulation without cutting the wire. This type of wire stripper is used by rotating it around the insulation while applying pressure in order to make a cut around the insulation. Since the insulation is not bonded to the wire, it then pulls easily off the end.
- Another type of manual wire stripper is very similar to the simple design previously mentioned, except this type has several notches of varying size. This allows the user to match the notch size to the wire size, thereby eliminating the need for twisting. Once the device is clamped on, the remainder of the wire can simply be pulled out, leaving the insulation behind.

**Automatic Wire stripper**
- An automatic wire stripper simultaneously grips the wire from one side and cuts and removes the insulation from the other. To use it, one simply has to place the wire in the jaws and squeeze the handle.
Handtools

❖ Screw drivers

- is a tool for driving screws and rotating other machine elements with the mating drive system.
- is made up of a head or tip (eg. slot, philips, hexagon and many more), which engages with a screw, a mechanism to apply torque by rotating the tip, and some way to position and support the screwdriver.

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Handtools

- Other tools you need to know for electronic equipment maintenance...
  - Pliers
  - Test pen
  - Cable cutter
  - Many more....