Classroom Material/Equipment Requirements
Photovoltaics – Level 1
ETA® International

Some of these tools are time savers, but not required. (Oscillating tool instead of sandpaper for example – you must have one or the other as a minimum). Appropriate tools for your geographic location may be substituted in your course approval listing rather than the described North American SUGGESTED listing.

Classroom suggested items:
1. Manual/Workbook (approved by ETA® Course Approval)
2. Support and resource materials (videos, catalogs, spec sheets, additional books)
3. Slide or video presentation(s)
4. Calculators
5. Internet access
6. Copy of the NEC® Handbook (recommended)
7. White board/poster board with markers

Consumables:
1. AWG wire and stranded wire (e.g. #10 bare, black, white) as needed
2. Wire connectors and grounding connectors (including screws, nuts/bolts)
3. 12-volt switch(es)
4. 12-volt fuse(s)
5. 12-volt disconnect(s) (DC)
6. Half (½") inch EMT conduit
7. Half (½") conduit connectors
8. Clear all-weather sealant

PV Equipment and Installation Materials:
1. Solar panels (minimum of 3)
2. Commercial racking to mount panels
3. 12-volt deep cycle batteries (minimum of 4)
4. Combiner box (with breakers) or NEMA 3R rated junction box
5. AC disconnect
6. DC disconnect
7. Service panel box
8. Inverter
9. Two copper grounding electrodes
10. Micro-inverters (optional)
11. Power Optimizer (optional)
12. Charge Controller (optional)

(over)
Tools (insulated tools are best) and installation items:

1. Volt-Ohm meter(s) / multimeter
2. Kill-A-Watt meter
3. Pyranometer (solar energy meter)
4. Solar Pathfinder (or equivalent)
5. Infrared thermometer
6. Load element (e.g. light bulb, LED, small motor–visually verify system connections)
7. Wire strippers, crimpers, cutters
8. Screw drivers: Philips and flat-head, different lengths
9. Variable speed drill(s) with various drill bits and driver bits
10. Socket set(s)
11. Pliers: standard, needle-nose, locking, pipe
12. Assorted open end wrenches and pipe wrench
13. Hammers: claw or framing, ball peen, rubber mallet
14. Cutting tools: hack-saw or reciprocating saw,
15. Sanding tools: oscillating or sander tools, sandpaper, files
16. Fiberglass ladder (appropriately rated for weight)
17. Personal climbing harness / lanyard
18. Compass (or smart phone with compass app)
19. Half (½") inch one-shot EMT conduit bender
20. Hard hat
21. Safety gloves
22. Safety goggles
23. Fish tape
24. Stud finder with electrical wiring/cable and pipe alerts
25. Permanent marking pens
26. Measuring tape or Surveyors tape (30-100 feet/meters)
27. Metal ruler (foot, yard or meter)
28. Small level