Course Outline AGED 520  
Summer 2014

Electricity

- Reference Material
  - www.need.org
  - www.NECconnect.org

- Principles of electricity
  - Terms
  - Atoms & electricity
    - Molecule Modeling Activity
  - Sources of electricity
    - Windmill Activity
  - Transformers
  - Types of electrical loads

- Electricity calculations
  - Series circuits
  - Parallel circuits
  - Combination circuits

- Quiz - basic electricity

- Electrical Wiring Practices based on the National Electric Code
- Residential Wiring
  - Terms
  - Outlet locations
  - Number of circuits

- Rough-in wiring practices

- Ten common wiring problems

- Floor plans and symbols

- Wiring circuits
  - Duplex convenience outlets
  - 3-way switches

- Sizing Electrical Boxes

- Grounding – what it is and acceptable grounding methods

- Voltage Drop – sizing wire to the current load and wire length

- Stray Voltage – what it is and where it comes from

- Lighting – number if lights in a building

- Principles of electronics

- Project:
  - Wire residential building circuits
  - Wire circuit boards
  - Construct a diode circuit
    - Breadboard Activity
Shop Skills:
  o Reference Material
    ▪ Safety Tests: www.alce.vt.edu
  o Carpentry – Craftsmanship
    ▪ Hand and power tool usage
    ▪ Fasteners – glues, nails, dowels, etc
  o Possible projects:
    ▪ Build a shelf (Plans with Scale Drawing, Directions, Bill of Materials, Cut List)
    ▪ Build a “nothing” (a block requiring accurate measuring and multiple tool usage)

Construction:
  o Reference Material
    ▪ www.thisiscarpentry.com
    ▪ Midwest Planning Services Materials
  o Carpentry tools and tool usage
  o Wood frame construction
    ▪ Selection of materials
    ▪ Construction practices
  o Concrete construction
    ▪ Selection of materials
    ▪ Calculating yardage
    ▪ Block construction
  o Possible projects/Activities
    ▪ Stake out a building
    ▪ Layout wall plates
    ▪ Layout stairs or rafter

Metal Work
  o Reference Materials
    ▪ Lincoln Electric Teacher’s Materials
    ▪ WIU STEM Lesson Plans
  o Arc welding:
    ▪ Terminology and basic information
    ▪ Selecting equipment
    ▪ Electrode selection
    ▪ Exercises in welding mild steel
  o MIG welding:
    ▪ Equipment selection
    ▪ Principles of operation
    ▪ Exercises in welding mild steel with MIG
  o Oxy-Fuel Gas Welding, Brazing and Cutting:
    ▪ Equipment selection
    ▪ Principles of operation
    ▪ Exercises: in fusion welding, brazing, and cutting mild steel
Engines:

- Reference Material
  - Briggs and Stratton Power Portal: [http://www.thepowerportal.com/Login.htm](http://www.thepowerportal.com/Login.htm)
- Use of precision measuring tools
- Principles of operation of SGE (Otto cycle, fuel, electrical system)
- Trouble shooting small gas engines
- **Project:** Overhaul of a small gas engine