

## Course Offering

### Fundamentals of Geothermal Renewable Energy Systems 101

This curriculum begins with an introduction to the efficiency and operation of a geothermal renewable energy system. Students will learn the mechanics of heat pump operation and the relationship between past refrigerants and the new environmentally friendly refrigerants required for all new systems after 2009. Specific attention is devoted to the relationship between refrigerant and heat pump design for optimum efficiency. Students will learn the relationship between Coefficient of Performance (COP) and Energy Efficiency Ratio (EER) and how these values relate to the overall operation efficiency of a geothermal system. The internet will be used extensively for research and as a reference for computer modeling of system operation. Instruction units will include segments on:

- Calculating heat gain and heat loss as a means to properly size geothermal systems
- Energy analysis and operation simulations
- Proper duct sizing and installation
- Geothermal system components
- Fundamentals of geothermal loop design
- Geothermal piping design for closed and open loop applications
- Circulation pump sizing
- Antifreeze protection and system flush and fill procedures
- Polyethylene pipe heat fusion procedures
- Multi-stage thermostat controls wiring
- Geothermal controls theory and operation
- Electrical wiring
- Job site safety practices

Lab instruction is structured to provide the student with hands-on experience in the assembly, operation, and performance testing of a working geothermal system by employing the same methods required for a field installation.

Field trips to active geothermal installations provide perspective to the magnitude and importance of geothermal systems in reducing both energy consumption and our carbon footprint in this rapidly growing industry.

Course testing is designed to show student proficiency by reinforcing information learned in previous study modules and identifying student weaknesses so that they may be addressed such that graduating students will possess the necessary work skills to function as "Entry Level" geothermal installation, basic service or sales technicians.

Course text and instruction follows IGSHPA and NATE guidelines. Students completing the course should be well prepared to take the IGSHPA/NATE accreditation test which is available for those wishing to continue in the Geothermal Service and Installation vocation.