

CORE

GT-1000 Solar Photo Voltaic Lab

GT-2000 Wind Turbine Technology Lab

GT-3000 Fuel Cell Technology Lab

GT-4000 Environmental Monitoring Lab

GT-5000 Hydro Power Technology Lab

GT-6000 Bio Fuels Technology Lab

Optional

GT-7000 Sustainable Design Technology I Lab

GT-7500 Sustainable Design Technology II Lab

180 HOURS

Chapter 1. Introduction to Green Technologies

Introduction to Green Technologies

- Energy Crisis?
- Global Warming?
- The Electrical Power Grid
- Global Power Economics
- Sustainable Resources
- General Energy Saving Practices
- General Green Practices

Chapter 2. Windmills

Introduction to Wind Technologies

Safety Issues

- Electrical Safety
- Mechanical Issues

Science

- Kinetic Energy
- Wind Energy
- Mechanical Energy
- Electromagnetism
- Aeronautics
- Weather and Climate
- Motion and Force
- Simple Machines
- Electricity

Technology

- Electrical Generators
- Propeller Blades
- Bearings
- Electrical Interfacing
- Battery Storage Systems
- Residential Power Systems

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Engineering

- Research
 - Personal Windmills
 - Commercial Wind Farms
 - Blade Designs
 - Design Limits
 - Attaching to the Power Grid
- Design
 - Designing a Windmill Addition to an Existing Residence

Math

- Electrical Quantities
 - AC Electricity
 - Power
- Mechanical Quantities
- Residential Load Calculations
- Applying Energy Costs

Chapter 3. Solar Energy

Introduction to Solar Technologies
General

Science

- Solar Energy
- Photovoltaic Action
- Light
- Electricity
- Semiconductor Materials
- Evaporation

Technology

- Solar Cell Arrays
- Solar Collectors
- Solar Water Heaters
- Inverters
- Battery Storage Systems
- Residential Power Systems
- Generator Charging Systems (for Off-grid Applications)
- Desalination

Engineering

- Research
 - Residential Solar Water Heaters
 - Commercial Solar Arrays
 - Portable Solar Power Generators
 - Attaching to the Power Grid
- Design
 - Designing a Residential Solar Panel
 - Designing a Residential Solar Water Heater
 - Design a Solar Powered MP3 Player

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Math

- DC Electricity
- Electrical Quantities
- Series and Parallel Circuits
- Residential Load Calculations
- Cost Recovery Calculations

Chapter 4. Bio-fuels

Introduction to Bio-fuels

Science

- States of Matter
- Photosynthetic Plants
- Distillation
- Agriculture
- Biochemistry

Technology

- Solar Stills
- Diesel Technology
- Biomass

Engineering

- Research
 - Distillation processes
 - Biofuel Types
 - Diesel/Biofuel Conversions
 - Biofuel Sources (Corn, Sea Grass, Kudzu, etc)
- Design
 - Designing a Solar Still
 - Designing a Bio Diesel Add On

Math

- Thermal Quantities
- Mileage Computations/Comparisons
- Gallons/Acre Computations

Chapter 5. Fuel Cells

Introduction to Fuel Cell Technology

Science

- Electrochemical Conversion
- Catalysis
- Electronics
- Properties of Matter
- Electrolysis

Technology

- Energy Storage Systems
- Electrolyzers
- Reformers

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Engineering

- Research
 - Fuel Cell Automobiles
 - Fuel Cell Space Vehicles
- Design
 - Designing a Fuel Cell Powered Vehicle
 - Designing a Fuel Cell Power Source for a Remote Sensor Station

Math

- Efficiency
- Ohms Law

Chapter 6. Sustainable Design

Introduction to Green Construction
LEED Certification
Interior Design
Energy Star Certification

Science

- Thermal Radiation
- Architecture

Technology

- Intelligent devices
- Construction Techniques
- Energy Analysis
- Green Building Products
- Recycling
- Building Information Modeling
- Bio-Based Products
- Geo-Thermal Power Systems

Engineering

- Research
 - Electrical Codes
 - Construction Processes
 - Recovered Materials Advisory Notice
 - Recyclability
 - Blueprint Reading
- Design
 - Designing a Green Kitchen
 - Designing a Green Bath Room

Math

- Life cycle cost
- Building Efficiency

Chapter 7. Environmental Monitoring

Introduction to Environmental Monitoring Technologies

Science

- Geography
- Aquaponics
- Scientific Method
- Weather

Technology

- Instrumentation
- Environmental Sensors
- Computer Interfacing

Engineering

- Research
 - Air Quality Monitoring
 - Water Quality Monitoring
- Design
 - Designing

Math

- Conversions

Chapter 8. Additional Green Technologies

Geothermal Technologies

- Geothermal Power
- Geothermal Heating and Cooling
- Thermodynamics
- Safety/Pollution Considerations
- Heat Exchangers
- Geothermal Desalination

Hydro Power

- Hydraulic Power
- Hydroelectricity
- Hydrology
- Dams
- Water Wheels
- Micro-Hydro Power Plants
- Physics
- Math (Calculation of falling water power)
- Flow volume

Electric Vehicles

- Hybrid Vehicles
- Electric Vehicles
- Energy/Force
- Energy Conversion
- Vehicle Efficiency

**For additional information contact IST Ohio at (419) 775-5933 or at sales@istohio.com
Please visit IST Ohio on the web at www.istohio.com**