

Learning Outcomes – Nuclear Power Plants Essentials

Series Learning Outcomes

At the end of the series you'll be able to:

- Identify the different components and subcomponents of a nuclear power plant in form and function
- Describe the flow and conversion of energy throughout a nuclear power plant
- Define differences and similarities between different types of nuclear power plant and other thermal power plants
- Cite and quantify key operating parameters of nuclear power plants such as operating temperature and pressure
- And contrast key considerations in the creation and operation of a nuclear power plant, such as safety, cost, physics, ease of construction and maintenance, and politics

Video 2 Learning Outcomes – Core Concept

At the end of this video you'll be able to:

- Identify the different components of a nuclear power plant in form and function
- Describe the flow and conversion of energy through a nuclear power plant
- Define the differences and similarities between a nuclear power plant and other thermal power plants
- Cite and quantify key operating parameters of a nuclear power plant, such as operating temperature and pressure
- And contrast key considerations in the creation and operation of a nuclear power plant, such as safety, cost, physics, ease of construction and maintenance, and politics

Video 3 Learning Outcomes – Reactor and Steam Generator

At the end of this video you'll be able to:

- Identify the different components of a nuclear reactor and steam generator in form and function
- Describe the flow and conversion of energy through a nuclear reactor and steam generator

- Explain the primary reaction of nuclear fission and its by-products
- Identify the methods of controlling the nuclear fission reaction in normal operation and in emergencies
- Cite and quantify key operating parameters of a nuclear reactor and steam generation, such as neutron speed, number and dimensions of fuel rods, and the dimensions of the heat exchanger
- Contrast key considerations in the creation and operation of a nuclear reactor and steam generator, such as safety, physics, and ease of maintenance

Video 4 Learning Outcomes – Fission and Radioactive Energy

At the end of this video you'll be able to:

- Identify the different components of the fission reaction
- Define the 'half-life' of radioactive materials
- Define the differences and similarities between the different atoms and isotopes in the fission reaction
- Cite and quantify key parameters in radioactive reactions, including proportion of energy release, half-life of particles emitted, and radioactive decay rates
- Contrast key considerations in the nuclear power plant, based on key physical phenomena in the fission process

Video 5 Learning Outcomes – Different Types of Reactors

At the end of this video you'll be able to:

- Compare the different types of nuclear reactors
- Identify the different components of each type of nuclear reactor in form and function
- Describe the flow and conversion of energy through each type of nuclear reactor
- Cite and quantify the key operating parameters of each type of nuclear reactor, such as operating temperature and pressure
- Contrast key considerations in the creation and operation of each type of nuclear reactor, such as safety, cost, ease of construction and maintenance

Video 6 Learning Outcomes – Turbine and Generator

At the end of this video you'll be able to:

- Identify the different components of a steam turbine in form and function
- Describe the flow and conversion of energy through a steam turbine and generator
- Identify the key phenomenon exploited in a steam turbine to generate rotational energy
- Describe a typical layout of multistage steam turbines used in thermal power plants
- Cite and quantify the key operating parameters of a steam turbine, such as operating temperature and pressure
- Contrast key considerations in the creation and operation of a nuclear power plant, such as efficiency and physics

Video 7 Learning Outcomes – Condenser

At the end of this video you'll be able to:

- Identify the different components of a condenser in form and function
- Describe the flow and conversion of energy through a condenser
- Contrast key considerations in the creation and operation of a nuclear power plant, such as maintenance

Video 8 Learning Outcomes – Cooling Tower

At the end of this video you'll be able to:

Identify the different components of a cooling tower in form and function

Describe the flow and conversion of energy through a cooling tower

Identify the key phenomenon that is exploited in a cooling tower to reduce the water temperature

Contrast key considerations in the creation and operation of a nuclear power plant, such as physics and social effects