



Passive Building Foundations

Course Syllabus

Module 1 | Introduction

Module 2 | Building Science

Module 3 | Passive Building

Module 4 | Phius Standards

Module 5 | Phius Certification Process

Module 6 | The Business Case

Module 7 | Policy

Module 8 | Case Studies

Module 9 | Beyond the Building

1 | Introduction

Who is Phius?

What Does Phius Do?

- Research and Standard Setting
- Building Certification
- Product Certification
- Training and Education
- Professional Certification
- Development of Tools and Resources
- Advancing Policy

Phius Alliance

What is the Phius Alliance?

Events

- PhiusCon
- Annual Summit
- Webinars

2 | Building Science

Background

- Safety, Regulations, and Building Code
- Building Science is All Around Us

Heat Flow

- Heat Transfer
- Sources of Heat in Buildings
- Controlling Heat Flow

Air Flow

- Air Flow
- How Much Air?
- Controlling Air Flow

Moisture

- Moisture in the Air
- Moisture Flow
- Controlling Moisture Flow

Condensation and Mold Growth

Comfort & Occupant Impact

Comfort & Indoor Air Quality

3 | Passive Building

Introduction & Learning Objectives

Introduction to Passive Building

Passive Building Principles

Control Strategies

Passive Building Principles

Climate Specific Design & Construction

Passive Building Physics

Key Terminology and Concepts

Heat Losses and Gains in Buildings

Energy Modeling Tools & Purpose

High Performance Building Enclosures

High Performance Opaque Enclosures

High Performance Glazing & Fenestration

High Performance Mechanical Systems

High Performance Ventilation Systems

High Performance Space Conditioning Systems

High Performance Hot Water Systems

Types of Passive Projects

Residential, Non-Residential, New Construction & Retrofit

Carbon Emissions in Buildings

Decarbonization & Electrification

Categorizing Emissions

Embodied Emissions

Operational Emissions

4 | Phius Standards

Phius Standards

Phius Standards & Certification Paths

Overview of Requirements

Phius Standard Requirements

- Passive Conservation Requirements
- Airtightness Requirements
- Appropriate Moisture Design Requirements
- Window Comfort Requirements
- Active Conservation Requirements
- 3rd-Party On-Site Inspection and Quality Assurance
- Electrification and Electric Vehicle Charging Infrastructure
- Renewable Energy

5 | Phius Certification Process

Project Certification Process and Resources

- Certification Process & Milestones
- Roles of Phius Certified Professionals

Project Certification Resources

- The Phius Certification Team
- Phius Certification Guidebook

6 | The Business Case

Financing

- Incentives & Cost
- The Energy Services Business Model

On the Horizon

- Scaling & Prefabrication
- Grid & Future Impacts

7 | Policy

Introduction

- Background of Phius and Policy
- Learning Objectives

Primary Policy Avenues

- Incentive Programs
- Qualified Allocation Plans for Low Income Housing Tax Credits

Building Energy Codes
Federal Programs

Supporting Data

Supporting Data
The Phius Policy Database

Next Steps & Future Policy

8 | Case Studies

Doig River Cultural Center Case Study

The Homes at Anne M Lynch at Old Colony Phase Three C

Fifth Street Passive House

Theresa Passive House

425 Grand Concourse

Acton Passive House

9 | Beyond the Building

Background

Introduction & Industry Trends
The Existing Electrical Grid

The Changing Electric Grid

The Changing Electric Grid
Renewable Energy & Energy Storage

Advancing Decarbonization

Renewable Energy for Buildings
Electric Vehicles
Grid Interactive Efficient Buildings
Microgrids
Low-Load Buildings