



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?

Overview

Mission and Goals

History of Phius

Passive Building Science Pioneers

Passive House or Passive Building?

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