MSBPD

Master of Science in Building Performance & Diagnostics

CARNEGIE MELLON —ARCHITECTURE

Year 1

Fall (45 Units min)

Pre-Requisite

48-635 | ES 1: Climate, Energy in Bldgs. (9)

Research Methods & Frameworks

48-620 | Situating Research (3)

Bldg. Perform., People & Enviro.

48-729 | Sustainability, Productivity, Health & Quality of the Built Environment (9)

48-798 | Integrated Building systems: HVAC, Enclosure & Energy (9)

Data Analytics, AI & Simulation

Minimum 6 units of Coding Proficiency: Coursework in Python or a comparable programming language fulfilling the program's coding outcomes. See approved courses below.

Electives

Spring (40 Units min)

Research Methods & Frameworks

48-711 | Paradigms of Research (9)

Bldg. Perform., People & Enviro.

48-692 | Shaping Light (9)

48-722 | Bldg. Performance Modeling (9)

Data Analytics, AI & Simulation

48-569 | 781 Geospatial Data Analytics in Infrastructure Planning (9)

Minimum 6 units in Data Analytics/ Spring or Fall (see approved list below)

Electives

Year 2

Fall (40 Units min)

Research Methods & Frameworks

48-769 | Thesis Prep (18)

Bldg. Perform., People & Enviro.

48-768 | IEQ & Post Occupancy Eval. (9)

Data Analytics, AI & Simulation

Minimum 9 units in Statistics

Electives

Spring (36 Units min)

Research Methods & Frameworks

48-769 | Thesis (18)

Bldg. Perform., People & Enviro.

48-721 | Bldg. Controls and Diagnostics (9)

Sustainability & Env. Ethics

Minimum 6 units in areas addressing sustainability, environmental ethics, or related theoretical frameworks

Electives

Program Description

The Master of Science in Building Performance & Diagnostics (MSBPD) at Carnegie Mellon University is a two-year program for graduates in architecture and engineering who seek to advance human health and environmental sustainability through the built environment.

Over four intensive semesters, students engage in coursework spanning sustainability science, performance simulation, data analytics, social science, statistics, and policy.

Taught by faculty from architecture, engineering, computation, and policy, the curriculum fosters interdisciplinary collaboration and critical inquiry into how buildings perform for people and the planet.

Graduates pursue leadership roles in design, consulting, government, and research, shaping high-performance buildings and resilient communities.

For those admitted with a PhD advisor, completion of the MSBPD curriculum fulfills the coursework requirements for the PhD in Building Performance & Diagnostics.

Program Requirements

In addition to the course requirements for the MSBPD program, students must satisfy:

• A minimum of 160 units of course work with a minimum residency of three (3) academic semesters at full-time status (36 units).

• A GPA of 3.0, with exceptions to be approved by the graduate faculty.

• Advanced standing & core course substitution that have been pre-approved by the Track Chair.

• Advanced standing of one or two semesters of coursework for qualified CMU students within the B.Arch and M.Arch program through the Accelerated Master's Program (AMP).

Approved Selectives

Building Performance, People & Enviro.

48-733 Environmental Performance Simulation (9)

Data Analytics, AI & Simulation

Coding:

15-110 Principles of Computing (10)
90-812 Introduction to Python (6)
95-888 Data-Focused Python (6)
46-881 Programming in R and Python (6)
12-746 Intro to Python Proto. for Infrastructure Sys. (6)
12-780 Advanced Python for Infrastructure Systems (6)
95-835 Time Series Forecasting in Python (6)

AI/ML:

10-601 Introduction to Machine Learning (12)
110-623 Generative AI (12)
10-718 Machine Learning in Practice (12)
11-667 Large Lang. Models:Methods & Applications (12)
95-796 Introduction to Artificial Intelligence (6)
17-691 Machine Learning in Practice (6)

Statistics:

36-600 Overview of Statistical Learning and Modeling (12)
36-749 Exp. Design for Behavioral & Social Sciences (12)
90-711 Statistical Reasoning with R (12)
36-627 Modern Experimental Design (6)
36-602 Advanced Methods for Data Analysis (9)
36-650 Statistical Computing (9)

Data Science:

12-741 Data Management (9)
90-885 Data Visualization and Dashboards (6)
94-870 Telling Stories with Data (6)
94-814 Data Analytics with Tableau (6)

Sustainability & Env. Ethics

48-743 Introduction to Ecological Design Thinking (9)
90-789 Resilient & Sustainable Communities (12)
12-714 Environmental Life Cycle Assessment (12)
48-795 Building Ratings in a Global Context (6)

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