

Master of Science (M.S.) in Building Performance and Diagnostics (2-year)

Program Description

The Master of Science degree program in Building Performance and Diagnostics is intended for practitioners, researchers, and educators in architecture and the building industry who wish to be leaders in advanced building technologies and their performance. The program covers, in depth, knowledge about the state-of-the-art in building systems integration and total building performance. The program culminates with a project in which students must apply the knowledge they have acquired to realistic problems, using the appropriate analytic and modeling skills. The program is open to graduates with a prior bachelor's degree and who have some connection with the building sector through architecture, engineering, planning, or management. Graduates of this program from Carnegie Mellon University have found outstanding careers in practice, industry, and education.

Curriculum

Year 1	Fall	Spring
General 9 units	48-711 Research Models and Methods in Architecture (9)	
Core 21 units	48-722 Building Performance Modeling (12)	48-723 Performance of Advanced Building Systems (9)
Core Selectives 18 units	SELECTIVES (18)* (Fall or Spring)	
Computing/ Alternatives 18 units	Recommended computing course:** (Fall or Spring) 15-100 Introductory /Intermediate Programming (10) 15-200 Advanced Programming (9)	
Open Selections 9 units	OPEN Selections (9)*** (Fall or Spring)	

* Selectives are courses that are accepted as fulfilling the requirement of showing proficiency in aspects of Building Performance and Diagnostics.

** Computing is not required for MS (BPD) students – recommended for those intending to do a PhD in performance simulation. Students may substitute with a selective or elective, subject to approval by the Graduate Program Committee.

*** Open selections enable students to take necessary prerequisites without extending the duration of their program. Students otherwise take elective(s) subject to approved by the Graduate Program Committee.

Year 2	Fall	Spring
Core 24 units	90-711 Empirical Methods for Public Policy and Management (12) +	90-722 Management Science I: Optimization and Multi-criteria Methods (6) +
	90-772 Operations Research for the Public Sector (6) +	90-760 Management Science II: Decision Risk Modeling (6) +
		48-721 Building Controls and Diagnostics (12)
Electives 15 units	ELECTIVES (15)* (Fall or Spring)	
Project 36 units	48-702 Master's project (18)+	48-703 Master's project (var. 18-36)+

+ Select 90-711 or any combination of 90-772, 90-722 and 90-760 for a total of 12 units.

++ Master's projects provide students with the opportunity to conduct research under the direction of the School's faculty. Normally, the project is undertaken in the Spring semester. However, with the approval of their faculty advisor, students may elect to spread the project over two semesters (18 units per semester) and take an appropriate number of required or elective courses to maintain full-time status.

Core Selectives These are among the concentration courses accepted by the program as fulfilling the requirement of students showing proficiency in core aspects of Building Performance and Diagnostics. The following courses are presently accepted as fulfilling this requirement:

- 12-651 Air Quality Engineering (9)
- 12-726 Mathematical Modeling of Environmental Quality Systems (12)
- 48-752 Zero Energy House (9)
- 48-725 Building Economics (9)
- 48-726 Acoustics and Lighting (9)
- 48-729 Special Topics in BPD (variable units)
- 48-737 Productivity, Health and Quality of Buildings (9)
- 48-795 LEED™ Buildings and Green design Concepts (9)
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Student may also elect to take other courses as concentration selectives, not listed above but offered elsewhere in the university and related to the interest area of Building Performance and Diagnostics (for example, courses in energy and environmental policy/systems, green design, etc.), subject to approval by the Graduate Program Committee.

Owing to periodic changes to the curricular offerings, students may, under the advice and of their faculty program coordinator, and approval of the Graduate Program Committee, elect alternative courses to fit within this category.

Open Selections

Open selections enable students to take necessary prerequisite courses, which may be required for certain concentration selectives, without extending the duration of their program.

The following physics course is recommended for students wishing to pursue an interest in the area of energy and environmental policy:

24-721 Thermodynamics

Students who wish to pursue a PhD in the Building Performance and Diagnostics in performance simulation are encouraged to take 15-211 Fundamental Data Structures and Algorithms for which the following course is a mathematical prerequisite:

21-127 Concepts of Mathematics

There may be other more suitable prerequisites that meet the student's specific interest. Those courses can be elected, after consultation with the Faculty Program Coordinator.

Student must submit all petitions for course substitution or election in writing through the Faculty Program Coordinator to the Graduate Program Committee for approval.

Degree Requirement

In addition to the standard requirements for all graduate students in the School of Architecture, students in this program must satisfy the following:

- Students must complete a minimum of 150 units of course work for graduation.
- The minimum residency requirement is 3 academic semesters. Full-time status (minimum 36 units per semester) is required during the residency period.
- Students must start the sequence of courses in the Fall semester.

Information for MSA Students

Students who have completed the Fall and Spring semester requirements of the MSA degree can apply for a transfer to the 2-year MS (BPD) Program. With the approval of the Graduate Program Committee, the student may enroll in the second year of the Program, subject to conformance to the Program requirements.

All course numbers/titles and their schedules may be subject to change. Please refer to the School of Architecture Graduate Programs Website [www.arc.cmu.edu] for the latest information.