

Sustainable Building: Materials Guide for a Healthy, Circular, Affordable Future

PCHM 0606



Course Meeting:

Online

Faculty:

cmurphy@newschool.edu

Program Description:

Developed by Parsons' Healthy Materials Lab, this program provides architects and designers with the tools and methods to make healthier building product choices while also being mindful of cost. Experts in the fields of materials, design, sustainability and public health offer insights and strategies to make changes to practice which will lead to the improvement in the overall health profile of all involved in the built process.

Designers are introduced to the relationship between the built environment and materials and why the chemicals in common building products can be harmful to human health. Strategies and roadmaps are presented to help learners navigate industry resources and certifications, find and evaluate alternate product options, and apply the findings for maximum impact. A range of methods is also explored to target specific issues for specific projects and lead to an improvement in the overall environmental and human health profile of residents. Better healthier, affordable materials choices will have both beneficial environmental sustainability and human health impacts.

Program Goal:

The goal of this course is to communicate the impact that building materials can have on human health, demonstrating the systemic intricacies that will challenge users to keep asking questions, while offering suggestions for how they can begin addressing these issues in their work.

Course Methodology:

This course consists of two in-depth modules:

Health in Practice

This first module is designed to empower you to design buildings to be healthier and more sustainable. We provide tools and methods to make healthier building product choices while being mindful of cost and larger issues of sustainability. Experts in the fields of materials, design, sustainability, and public health offer insights and strategies to make changes to practice, which will improve the overall health profile, carbon impact, and circularity in the building process.

Designing + Building A Healthy, Circular Future

Designing for material health is not a singular approach. It's a practice that impacts many decisions throughout the design process. This course focuses on strategies, methods, and priorities that architects and designers can use to help protect the health of all occupants of buildings and everyone involved in construction and maintenance.

Each module is divided into lessons that develop specific themes within the modules's broader subject. You will explore the topics of the course through readings, videos, and discussions with your peers. At the end of each module, you will find a summative quiz. You will be required to get 100% on the quizzes to move forward.

Evaluation

Assessments (Quizzes):

At the end of each module, you will find an assessment that poses questions and/or multiple-choice statements that cover topics you've learned throughout the lessons of that module.

The grade you obtain in each of the quizzes affects your final course grade. To pass the quizzes, you will need to earn a score of 100% on each quiz. You will have unlimited attempts to complete each of these quizzes.

Discussions:

On three occasions in each module, you will be required to engage in a discussion, on the preceding content, with your peers. This is a critical component of the learning process. Your active participation will not only enhance your own learning but also the collective knowledge of the group. A group we hope you will continue to engage with beyond this course. Once you complete the program you will have the opportunity to join a network of graduates.

Health in Practice Discussions: Responses to Discussion Posts (4)	25%
Quiz: Health in Practice	25%
A Healthy Circular Future Discussion: Responses to Discussions (4)	25%
Quiz: Designing + Building a Healthy Circular Future	25%
Total	100%

Learning Outcomes:

1. Understand building materials and the implications of their use in a wider environmental and human health context
2. Identify and understand the critical relationships between building materials, chemical toxicity, and environmental exposures that directly impact human health. Use this information to set human health design goals early in the design process and through the life of the project to occupation
3. Identify building products that are likely to be healthier options and evaluate them against your own established criteria by identifying the human health and environmental impacts that products can have through the entire life cycle of materials. Compare products, assess variables and constraints, and specify materials based on this information.
4. Develop design strategies to address the issues that impact materials selection in design practice to reduce the negative health impacts of materials on human health. Prioritize human health, utilizing existing tools and resources to integrate critical relationships within the context of the building material ecosystem and larger environmental issues.

Course Requirements:

This program and the courses within, are self-paced and can be completed at any time that works with your schedule. All course work must be completed by the end of the semester.

Course Completion and CEU Credits:

Certification of Completion, 8 AIA CEU (HSW), 8 IDCEC CEU (HSW)

Course Outline:

Module I: Health in Practice

- **Environmental Health and Vulnerable Populations**

We start by considering your clients, as individuals we encounter various health challenges that can be triggered or worsened by factors such as geographical location, economic circumstances, racial background, or age. The experts below discuss the effects of building materials on both human and environmental health, providing solutions to encourage immediate improvements in creating healthier spaces and planning for the future.

- Section Intro - **Alison Mears**, Director & Co-Founder, Parsons Healthy Materials Lab at The New School + Associate Professor of Architecture, The New School
- Hazard Identification and Retrospective on Asbestos - **Jim Valette**, President, Material Research L3C
- Material Composition and Exposure - **Ken Geiser**, Professor Emeritus, Distinguished Professor, Zuckerberg College of Health Sciences, UMass Lowell
- What We Make Affects People's Health - **Ken Geiser**, Professor Emeritus, Distinguished Professor, Zuckerberg College of Health Sciences, UMass Lowell
- How Do Chemicals Get into Our Bodies - **Dr. Maida Galvez, MD, MPH**, Professor of Environmental Medicine and Public Health & Pediatrics, Icahn School of Medicine at Mount Sinai
- Putting Risk into Context - **Dr. Maida Galvez, MD, MPH**, Professor of Environmental Medicine and Public Health & Pediatrics, Icahn School of Medicine at Mount Sinai
- What Happens When Chemicals Get into our Bodies - **Dr. Maida Galvez, MD, MPH**, Professor of Environmental Medicine and Public Health & Pediatrics, Icahn School of Medicine at Mount Sinai
- Vulnerable Populations and Systemic Injustice - **Ogonnaya Dotson-Newman**, Senior Program Officer, Environment Program, The JPB Foundation
- Working with Communities - **Ogonnaya Dotson-Newman**, Senior Program Officer, Environment Program, The JPB Foundation
- **Discussion 1: The Human Health Impacts of Building Materials**

- **Chemistry: Unlocking the Science**

To understand how particular outcomes and health impacts are achieved, we must understand the chemistry behind the materials and products we use. Experts give an introduction to healthier alternatives that are being formulated by Green Chemists and the chemicals of concern that currently exist. This content builds the foundation for the

following sections when we ask "How can project health goals be outlined and informed decisions be made?"

- Section Intro - **Catherine Murphy**, Director of Education, Parsons Healthy Materials Lab at The New School
- We Are Not Fine: Toxic Chemicals in Our Bodies - **Laura Vandenberg**, Associate Vice Chancellor for Research and Engagement, Professor of Environmental Health Sciences, University of Massachusetts Amherst
- Case Studies Relevant to Hazards and Building Materials: Lessons Learned? - **Laura Vandenberg**, Associate Vice Chancellor for Research and Engagement, Professor of Environmental Health Sciences, University of Massachusetts Amherst
- Six Classes of Chemicals of Concern - Green Science Policy Institute
- Current State of Regulation - **David Andrews**, Senior Scientist, Environmental Working Group
- Introduction: Green Chemistry - **John Warner**, President, Chief Technology Officer, Warner Babcock Institute for Green Chemistry
- How Does Green Chemistry Fit into the Big Picture? - **John Warner**, President, Chief Technology Officer, Warner Babcock Institute for Green Chemistry
- **Discussion 2: Reducing Exposure to Chemical Classes of Concern**

- **Life Cycle of Materials**

Materials impact human and environmental health at all stages of the life cycle, not just the use phase. In this section we look at the social and environmental systems that are impacted throughout the materials life cycle, and the populations that are most affected along the way. Our experts will share examples of the stories behind materials, what hazards exist and how to reduce them, and discuss prioritizing materials to meet health goals.

- Section Intro - **Alison Mears**, Director & Co-Founder, Parsons Healthy Materials Lab at The New School + Associate Professor of Architecture, The New School
- The Backstory of Materials and Health - **Mikhail Davis**, Director, Technical Sustainability, Interface
- Equity and Health - **Ana Baptista**, Associate Professor of Environmental Policy and Sustainability Management + Co-Director of the Tishman Environment and Design Center, The New School
- Make Better Products - **Amanda Kaminsky**, Director of Sustainable Construction - Americas, Lendlease
- **Discussion 3: Design for Healthier Life Cycles**

- **Indoor Air Quality (IAQ)**

We are the first generation to spend 90% of our time indoors; how can we best avoid or eliminate the risks associated with indoor air pollutants? This section takes a closer look at material health and the indoor environment, making distinctions between products and the materials that contain them, sources versus exposures, and the specifics of exposures in the indoor environment, including air quality

- Section Intro - **Catherine Murphy**, Director of Education, Parsons Healthy Materials Lab at The New School
- Toxicity Indoors - **Dr. Jeffrey Siegel, Ph.D**, Professor of Civil Engineering, University of Toronto
- Mitigating Indoor Air Pollutants - **Dr. Jeffrey Siegel, Ph.D**, Professor of Civil Engineering, University of Toronto
- IAQ Case Study: The Air in There - **Aaron Dorf**, Director, Snøhetta
- **Discussion 4: Breathe Easier: Improving your Indoor Air Quality**

- **Health in Practice**

What are the standards and regulations around the chemicals in building products, how are products assessed and reported, and how do we access and use this information? All of these questions will be examined in this section.

- Section Intro - **Alison Mears**, Director & Co-Founder, Parsons Healthy Materials Lab at The New School + Associate Professor of Architecture, The New School
- Reporting and Disclosure of Product Content - **Wendy Vittori**, Executive Director, Health Product Declaration Collaborative
- Certifications and Rating Systems - **Russ Perry**, Sustainable Designer, SmithGroupJJR
- Considerations in Practice - **Amanda Kaminsky**, Director of Sustainable Construction - Americas, Lendlease

- **Health in Practice Quiz**

Module II: Designing and Building a Healthy, Circular Future

- **Integrated Design Process**

Building on the ideas and issues earlier discussed, in this section we strategize on how best to set yourself up for success. What are the first steps in establishing frameworks and engaging your team? This section helps define the methods and frameworks that will be most appropriate to achieving your goals with the project. There are many ways of approaching healthier design, so we will look at different standards, metrics for

evaluation, and certification programs, and discuss what can work best based on budget, timing, replicability, etc.

- Section Intro - **Catherine Murphy**, Director of Education, Parsons Healthy Materials Lab at The New School
 - Identifying Health Goals and Opportunities for Impact - **Marty Keller**, Sustainable Building Project Management, Marty Keller LEED AP
 - Communicating Decisions and Articulating Product Criteria - **Rhys MacPherson**, Project Manager, MS&R Architects
 - Integrated Project Planning: Involving Critical Stakeholders - **Martha Lewis**, Head of Materials, Architect, Henning Larsen + **David Lewis**, Principal of LTL Architects, Dean of Parsons, School of Constructed Environments at The New School
 - **Discussion 5: How to Educate Yourself and Others**
- **Practice Makes Perfect**
 - Reconciling Material Health and Energy Efficiency - **James Connelly**, Chief Executive Officer, My Green Lab
 - Codes, Regulations, and Incentive Programs - **Breeze Glazer**, Co-Founder + Principal, LeapStep
 - Commonalities among Major Building Standards (LEED, LBC, WELL, EGCC, FitWel) - **Jack Dinning**, Senior Materials Specialist, Brightworks Sustainability
 - Customizing Your Own Framework - **Aaron Dorf**, Director, Snøhetta + **Dennis Rijkhoff**, Senior Associate, Architecture, SvN Architects + Planners

- **Various Teams Involved in a Successful Project**

Delving deeper into the specific roles of each part of the team, in this section experts look at the major challenges through the processes of design, construction, and ongoing maintenance and operation. This is not meant to be a comprehensive manual of best practice protocols, but rather a discussion of the lessons learned from experienced professionals who have been through the process. The goal for the design team will be to optimize their research, design choices, and communications strategies in order to have the greatest impact on health, while still being efficient, resourceful, and managing risk and liability. Understanding that the contractor's goals are to show measurable impact, maintain budget, coordinate trades and subcontractors, and deliver the project on schedule. We will look at how health initiatives can be presented in a way that resonates with contractors. The Maintenance & Operations team maintains the healthier conditions in the finished building, and helps prevent chemical contamination that could occur throughout use and upkeep of the building.

- **Design Team:**

- Section Intro - **Alison Mears**, Director & Co-Founder, Parsons Healthy Materials Lab at The New School + Associate Professor of Architecture, The New School
 - Communication Strategies for Engaging the Team - **Martha Lewis**, Head of Materials, Architect, Henning Larsen + **David Lewis**, Principal of LTL Architects, Dean of Parsons, School of Constructed Environments at The New School
 - Writing and Implementing Specifications - **Melissa Falcetti**, Information Manager, Applied Building Information, LLC
 - Material Categories: Where to Keep an Eye Peeled - **Martha Lewis**, Head of Materials, Architect, Henning Larsen
 - Engineering Controls: Expect the Best, Prepare for the Worst - **Shanta Tucker**, Director, Atelier Ten
 - Discussion 6: How to Overcome Challenges
- **Contractor + Team**
 - The Significance of Material Health to Contractors - **Emily Naud**, Associate, Integral Group + **Hank Burr**, Operations Manager, Bright and Burrly Farm
 - Defining Practices and Coordinating Subcontractors - **Geoff Brock**, Director of Sustainability, IPS–Integrated Project Services
 - Materials Procurement and Handling - **Geoff Brock**, Director of Sustainability, IPS–Integrated Project Services
 - Protective Measures through Installation - **Geoff Brock**, Director of Sustainability, IPS–Integrated Project Services
 - Commissioning and Preparing for Occupancy - **Geoff Brock**, Director of Sustainability, IPS–Integrated Project Services
 - Preparing for Renovation or Demolition - **Alejandra Arce Gomez**, Sustainability Manager, GCI General Contractors
 - **Discussion 7: Protective Measures for Contractors and Subcontractors**
- **Maintenance + Operation Team**
 - Project Turnover and the Role of Occupants - **Monica Nañez**, Director of Educational Programs, Silicon Valley Bicycle Coalition
 - Furnishings and Supplies - **Judy Levin**, Pollution Prevention Co-Director, Center for Environmental Health
 - Operations and Cleaning Protocols - **Jason Marshall**, Laboratory Director, Toxics Use Reduction Institute
 - Post Occupancy Monitoring and Engagement - **Monica Nañez**, Director of Educational Programs, Silicon Valley Bicycle Coalition
- **Designing + Building a Healthy Circular Future Quiz**
 - **Discussion 8: Bringing together a Healthier Materials Project**

- Conclusion
 - **Catherine Murphy**, Director of Education, Parsons Healthy Materials Lab at The New School