School of Architecture

Omar Khan
Location: CFA 201
www.soa.cmu.edu (http://www.soa.cmu.edu)

The School of Architecture (SoA) provides deep immersion in the discipline of architecture, intensified by the broader Carnegie Mellon culture of interdisciplinary innovation and creative inquiry. We define the discipline of architecture as the integrated pursuit of design creativity, historical perspective, social responsibility, technical expertise, and global environmental leadership. Our undergraduate and graduate degree programs prepare students to be excellent, discipline-defining design thinkers in diverse global contexts.

This world-class architecture education is enhanced by our position within one of the world’s leading research and entrepreneurship institutions, and by the foundational premise that architectural excellence demands both rigorous training in fundamentals and the development of unique specializations. Students may extend their core knowledge either through concentration in architecture subdisciplines like sustainable design or computational design, or through interdisciplinary interaction with CMU’s other renowned programs—whether the sciences, the humanities, business, or robotics. Though every School of Architecture student graduates with intensive architecture knowledge, no two graduates leave with the same education.

In the twenty-first century, few architecture problems are straightforward. Graduates of SoA excel in the roles architects have performed for centuries—and in new roles catalyzed by the depth and breadth of their education—to create and execute innovative solutions to a huge range of emerging global challenges.

Bachelor of Architecture Program

The School of Architecture’s NAAB-accredited five-year Bachelor of Architecture (B.Arch) (https://soa.cmu.edu/undergraduate/) program leverages the unparalleled opportunities at Carnegie Mellon University. Our students graduate with a professional degree that prepares them to excel in practice—but that also launches them into key specialties within the profession. The B.Arch program begins with a highly scripted three-year sequence of foundation courses and studios—the fundamental, core architecture education essential for every professional. In the fourth and fifth years, students follow a path forged by their own interests, choosing an Advanced Synthesis Option Studio (ASOS) and electives each semester.

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Each course required for the B.Arch program falls into one of seven categories, each pursuing a set of specific objectives for student learning:

- **Studio:** Architectural design studio (prescribed for the first three years and selective thereafter) is the backbone of every semester in the B.Arch program. Students learn to combine rigorously rational and resourcefully creative techniques to identify design problems, collect and analyze data, apply theoretical and practical strategies in creation of a design solution, and evaluate its results through extensive testing; and to describe and work at various points along the continuum between form-finding and form-making. (Courses: Foundation I & II, Elaboration I & II, Integration I & II, Advanced Synthesis Options Thesis/Studio I & II)
- **Critical Practice:** A multifaceted field of practice, architecture interacts with dynamic social, organizational, economic, professional, and cognitive contexts. In this sequence, students learn to use methods from cognitive psychology to analyze the influence of human factors on design, construction and occupancy; to resolve ethical dilemmas with adjudication strategies based in architectural case study; to demonstrate critical awareness and broad understanding of the factors informing the intelligent resolution of architecture and construction; and to identify the roles of architects, urban designers and planners in shaping the built environment in a global context. (Courses: First Year Seminar: Architecture Edition I & II, Case Studies in Architecture and Urban Studies, Human Factors in Architecture, Real Estate Development, Issue of Practice)
- **Design Tools:** Drawing and modeling both by hand and with the computer are core skills for developing powers of observation, the ability to think in three dimensions, and the communication of architectural ideas. By using a range of analog and digital design tools to engage in the act of making, students will be able to explore, analyze, formulate, fabricate, and represent ideas about the built environment. (Courses: Analog and Digital Media I, Analog and Digital Media II)
- **Environmental Science:** Environmental education is one of our highest priorities. In this sequence, students learn to describe first principles of and computational approaches to the lighting and thermal performance of buildings; to demonstrate qualitative and quantitative climate- and environment-responsive strategies (energy conservation, passive heating/cooling, daylighting, natural ventilation); to select, configure, and represent building service systems; and to maintain global awareness of high-performance systems-integration strategies. (Courses: Building Physics, Environment I: Climate & Energy, Environment II: Mechanical Systems for Buildings)
- **History:** In architectural history courses, students learn to identify chronologically and geographically diverse building styles, building types, and urban plans; to describe the cultural, intellectual and aesthetic contexts surrounding the creation of those buildings and sites; to write clearly and persuasively about the historic built environment; and to demonstrate critical thinking, quality research, and effective information management. In addition to the two-semester Historical Survey of World Architecture, each student completes one elective course on architectural history within the School of Architecture. A minor in architectural history is available to students completing four additional, approved, nine-unit architectural history courses beyond these three required courses. (Courses: Historical Survey of World Architecture and Urbanism, Modern Architecture, Architectural History III)
- **Building Technology:** We understand technical knowledge as design knowledge and place major emphasis on understanding the state-of-the-art and innovative building structure, enclosure, mechanical, lighting, and interior systems. Students learn to design gravity- and lateral load-resisting systems for buildings; to select, configure and size construction systems in wood, masonry, steel, and concrete; and to distinguish among construction materials with regard to their process of manufacture, their physical properties, their environmental performance, and their methods of selection and specification. (Courses: Materials and Assembly, Structures/Statics)
- **General Studies:** University coursework in mathematics, physical sciences, social sciences, writing, and history are prerequisite to the School’s own offerings. (Courses: Exploring Pittsburgh, Interpretation and Argument, Computing @ Carnegie Mellon, Descriptive Geometry, Generative Modeling, Fundamentals of Computational Design, University Electives)

Curriculum

Bachelor of Architecture

Minimum units required for Bachelor of Architecture 450

First Year: Foundation

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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tr>
<td>48-100</td>
<td>Architecture Design Studio: Foundation I</td>
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<td>48-025</td>
<td>First Year Seminar: Architecture Edition I</td>
<td>3</td>
</tr>
<tr>
<td>62-122</td>
<td>Digital Media I</td>
<td>6</td>
</tr>
<tr>
<td>62-125</td>
<td>Drawing I</td>
<td>6</td>
</tr>
<tr>
<td>62-106</td>
<td>Architecture and the Arts</td>
<td>9</td>
</tr>
<tr>
<td>76-101</td>
<td>Interpretation and Argument</td>
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<tr>
<td>99-101</td>
<td>Computing @ Carnegie Mellon</td>
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<td>48-105</td>
<td>Architecture Design Studio: Foundation II</td>
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<td>48-026</td>
<td>First Year Seminar: Architecture Edition II</td>
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<td>62-123</td>
<td>Digital Media II</td>
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Second Year: Elaboration

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<td>Architecture Design Studio: Elaboration I</td>
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<td>48-215</td>
<td>Materials &amp; Assembly</td>
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<tr>
<td>48-116</td>
<td>Building Physics</td>
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<td>62-225</td>
<td>Generative Modeling</td>
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<tr>
<td>48-205</td>
<td>Architecture Design Studio: Elaboration II</td>
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<tr>
<td>48-215</td>
<td>Materials &amp; Assembly</td>
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<td>48-241</td>
<td>Modern Architecture</td>
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<td>62-275</td>
<td>Fundamentals of Computational Design</td>
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Third Year: Integration

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<td>48-300</td>
<td>Architecture Design Studio: Integration I</td>
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<tr>
<td>48-315</td>
<td>Environment I: Climate &amp; Energy in Architecture</td>
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<td>48-250</td>
<td>Case Studies in Architecture and Cities</td>
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<td>48-305</td>
<td>Architecture Design Studio: Integration II</td>
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<td>48-380</td>
<td>Real Estate Design and Development</td>
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<td>Issues of Practice</td>
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<td>48-497</td>
<td>Pre-Thesis (Optional)</td>
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Fourth Year: Advanced Topics

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<td>Advanced Synthesis Options Studio I</td>
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<td>48-432</td>
<td>Environment II: Design Integration of Active</td>
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<td></td>
<td>Building Systems</td>
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<td>48-xxx</td>
<td>Architectural History III (Elective)</td>
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<td>48-410</td>
<td>Advanced Synthesis Options Studio II</td>
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Fifth Year: Advanced Topics

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<td>48-500</td>
<td>Advanced Synthesis Options Studio III</td>
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<td>or 48-509</td>
<td>Architecture Design Studio: Thesis II/</td>
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<td></td>
<td>Independent Project</td>
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<td>xx-xxx</td>
<td>University Elective</td>
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</tr>
<tr>
<td>xx-xxx</td>
<td>University Elective</td>
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Minors in Architecture

Undergraduate Architecture students in the School of Architecture may, in addition to their primary degree, pursue minors within the subject of architecture (https://soa.cmu.edu/minors/). These are the minors in Architectural Design Fabrication, Architectural History, Architectural Representation and Visualization, and Building Science. Non-architecture majors may, in addition to their primary degree, pursue minors in Architecture, Architectural History, Architectural Representation and Visualization, and Architectural Technology.

The Minors in Architecture sequence is for candidates who intend to develop intellectual links to the architectural profession. The scope of courses offered includes a full spectrum of professional issues in architecture. (Available to non-architecture majors only.)

The Minors in Architectural Design Fabrication is intended for those who wish to develop focused, disciplinary expertise in both analog and digital material methods for shaping the built environment and become involved in a community of practice dedicated to a rigorous pursuit of making as a mode of architectural research and cultural expression. It is also for students interested in gaining advanced placement in the SoA's Master of Advanced Architectural Design (MAAD) program. (Available to architecture majors only.)

The Minors in Architectural History is intended for those students that want to deepen their knowledge in architectural history. (Available to both architecture majors and non-architecture majors.)

The Minors in Architectural Representation and Visualization is intended for those students who wish to develop particular skills in architectural representation, and for those who are interested in gaining advanced placement in the SoA's Master degree program in Computational Design (MSCD). (Available to both architecture majors and non-architecture majors.)

The Minors in Architectural Technology is intended for those who seek to develop intellectual links to the technical aspects of the profession. (Available to non-architecture majors only.)

The Minors in Building Science is intended for those students that want to deepen their knowledge in the building sciences, and for those who are interested in gaining advanced placement in the SoA's Master degree programs in Building Performance & Diagnostics (MSBPD) or Sustainable Design (MSSD). (Available to architecture majors only.)

Graduate Degree Programs

Carnegie Mellon University is recognized for outstanding contributions to science, technology, management, policy, and the fine arts. The School of Architecture builds on a tradition of interdisciplinary study.

Our faculty's diverse set of backgrounds and commitment to professional practice and scholarly research make for a rich learning experience.

Our graduates hold positions in innovative design practices, research organizations, federal and municipal governments, the building and manufacturing industries, and at leading universities both in the US and abroad.

Our programs reflect a commitment to excellence. Students with motivation and ability receive an outstanding educational opportunity at Carnegie Mellon University’s School of Architecture.

The School of Architecture offers seven (7) Master's degrees, and three (3) Doctoral degrees in the following areas of study:

Master of Advanced Architectural Design

The Master of Advanced Architectural Design (MAAD) (https://soa.cmu.edu/maad/) is a post-graduate, studio-based program that engages emerging methods of design and fabrication through architectural design to speculate upon future modes of architectural practice, enhanced construction methods, and material culture within the built environment.

Master of Architecture

The Master of Architecture (M. Arch) (https://soa.cmu.edu/march/) is a NAAB-accredited (https://soa.cmu.edu/about/#naab), studio-based, first professional degree program to educate tomorrow’s leaders in architecture-related careers. Our M.Arch program is built on CMU’s 115-year tradition of
training architects in the practice of design and technical fundamentals, as well as the SoA's long legacy of leading-edge research. Students and faculty from around the world engage both the core of the discipline and tackle the great challenges of our built environment in focus areas of sustainable design, computational design, urban design, or construction management. Our M Arch program's strategically small size allows our self-motivated students to shape their individual educational agendas and career paths as they interact directly with a broad array of vertically integrated studios and advanced research projects in the school, the university, the local community, and around the world.

**Master of Science/Doctor of Philosophy in Architecture-Engineering-Construction Management**

A joint effort between the School of Architecture and the Department of Civil & Environmental Engineering, the Architecture-Engineering-Construction Management (AECM) (https://soa.cmu.edu/aecm/) prepares building delivery professionals for careers in capital project delivery dealing with the entire life-cycle of capital projects, from pre-design to design, construction, commissioning, operation, and maintenance stages. Graduates are educated to become effective decision makers who can positively impact economic, environmental, and ethical aspects of the built environment through professional management strategies. Our graduates have successful careers in government, industry, business, and NGO (non-governmental organization) sectors, prospering in positions where design professionals continuously make large-scale capital project design, construction, and maintenance decisions.

**Master of Science/Doctor of Philosophy in Building Performance and Diagnostics**

Our graduate programs in Building Performance & Diagnostics (BPD) (https://soa.cmu.edu/bpd/) have long led the world in advanced building technologies that sustainably reshape the built environment. BPD deals with the comprehensive integration of building design and advanced technology, as a means of producing high performance architecture. Led by the Center for Building Performance & Diagnostics (CBPD) (https://soa.cmu.edu/cbpd/) and housed within the Robert L. Preger Intelligent Workplace (http://www.cmu.edu/greenpractices/greenieng-the-campus/green-buildings/intelligent-workplace.html), students have the opportunity to gain both diversity and depth of knowledge from world-renowned and experienced faculty.

**Master of Science/Doctor of Philosophy in Computational Design**

One of the first and best-known Computational Design (https://soa.cmu.edu/computational-design/) programs in the US, our legacy continues today. The Computational Design program takes a computer science view of design, applying both the science and art of computing to design problems; in relation to creation, presentation, analysis, evaluation, interaction or aesthetic expression; in real and imagined applications, both perceived and conceived. From the beginning, the program has benefitted from close cooperation with other units of the university, particularly the School of Computer Science and the Department of Civil & Environmental Engineering. Our visionary students continue to push for innovation and evolution of the state-of-the-art in design technology.

**Master of Urban Design**

The Master of Urban Design (MUD) (https://soa.cmu.edu/mud/) is a studio-based program distinguished by its emphasis on integrating socially engaged practice with new tools and techniques for representing, understanding, and designing cities; by the opportunity to work in trans-disciplinary teams at the intersection of the arts, humanities and technology across Carnegie Mellon's departments and colleges; and by its location in Pittsburgh—a thriving post-industrial laboratory.

**Master of Science in Sustainable Design**

The Master of Science in Sustainable Design (MSSD) (https://soa.cmu.edu/mssd/) is a post-professional research-based graduate program focused on enabling deep expertise, critical thinking, and investigation of innovative sustainable strategies for the design of the built environment. The MSSD program explores technical and multicultural aspects of ecological thinking, while enabling actionable expertise in sustainable design methodologies. Based in the legacy of sustainability teaching at Carnegie Mellon University, the MSSD program prepares students to excel in research methods, and to become experts in integrative design thinking for the future of the built environment.

**Advanced Standing in Master Degree Programs**

The School of Architecture offers a unique opportunity to students who wish to pursue a Master’s degree in an architecture-related field through the Accelerated Master’s Program (AMP) (https://soa.cmu.edu/accelerated/). Undergraduate students may apply to the AMP in their 4th year of their architecture education; and if accepted, can apply units earned in their 5th year of their undergraduate architecture degree to their graduate degree. This allows students to graduate with a Master’s degree in an accelerated period of time.

**Student Advising**

At the end of each semester, the faculty reviews each student’s progress in all courses. Reviews during the first year are intended to determine a student’s capabilities in relation to the study of architecture at Carnegie Mellon University and the School works with each student to ensure placement within the university if a change is desired. Subsequent reviews monitor and ensure continued progress in all sequences of the program. Students are urged to meet with their assigned faculty mentor, first-year faculty advisor, and/or senior academic advisor to review their academic progress and plans before each semester. Such meetings are important to take full advantage of elective possibilities within the curriculum, general progress toward graduation, and professional goal setting. Students may also check their progress using the online academic audit in the Student Information Online (SIO) and should review the audit results with the senior academic advisor.

**Study Abroad**

The School of Architecture strongly encourages students to study abroad. The perspective gained through immersion in another culture and language is invaluable. Study abroad can fall into four categories: University Direct Exchanges, University Sponsored Programs, External Programs, and Departmental Summer Programs.

To receive credit for courses taken away, the student must have a C or better (not C-) in the course and have an official translated transcript sent to the School of Architecture. Studio work conducted abroad must be presented to the School Head and Studio Coordinator for approval.

Students should make the decision to study away by the fall of their third year so they can plan their courses accordingly. Students are allowed one semester away for which they receive studio credit except for those students at approved yearlong direct exchange programs. To qualify for study away, a student must have completed the third-year of their program, have a minimum overall GPA of 3.00 (or 2.75 for SoA summer study abroad) and be in good academic standing.

**Faculty**

AZIZAN ABDUL-AZIZ, Data Analytics Professor

SAROSH ANKLESARIA, Fitz-Gibbon Visiting Professor

MARY-LOU ARSCOTT, Studio Professor & Associate Head

NICOLAS AZEL, Adjunct Faculty

NINA BAIRD, Assistant Teaching Professor

NINA BARBUTO, Adjunct Faculty

JOSHUA BARD, Associate Professor

WILLIAM BATES, Adjunct Faculty

LOLA BEN-ALON, Adjunct Faculty

ARDAVAN BIDGOLOI, Robotics Fellow

HEATHER BIZON, Special Faculty

DARAGH BYRNE, Associate Teaching Track

JILL CHISNELL, Librarian

DANIEL CARDOSO LLACH, Associate Professor

DONALD CARTER, Adjunct Faculty

ERICA COCHRAN HAMEEN, Assistant Professor

DOUG COOPER, Andrew Mellon Professor
Liza Cruz, Associate Studio Professor
Dana Cupkova, Associate Professor
Gerard Damiani, Associate Professor
Stefani Danes, Adjunct Faculty
Jeffrey Davis, Adjunct Faculty
Marantha Dawkins, Adjunct Faculty
Emek Erdolu, Graduate Instructor
Jeremy Ficca, Associate Professor, Director dFAB
Lori Fitzgerald, Adjunct Professor
Laura Garafalo, Associate Professor
Ray Gastil, Director, Remaking Cities Institute
Sinan Goral, Adjunct Faculty
Stefan Gruber, Associate Professor
Kai Gutschow, Associate Professor
Volker Hartkopf, Professor Emeritus
Hal Hayes, Studio Professor
Matthew Huber, Adjunct Faculty
Jenna Kapelt, Director of Outreach Programs
Ömer Karagüz, Assistant Teaching Professor
James Katungyi, Graduate Instructor
Omar Khan, Professor & Head
Eddy Man Kim, Assistant Teaching Professor
Jeff King, Adjunct Faculty
Jonathan Kline, Associate Studio Professor
Ramesh Krishnamurti, Professor
Kristen Kurland, Teaching Professor
Goti Kyriaki, Kalla Visiting Assistant Professor
Khee Poh Lam, Professor Emeritus
Joshua D. Lee, Assistant Professor
Stephan R. Lee, Professor
Cindy Limauro, Professor of Drama
Katheryn Linduff, Adjunct Faculty
Vivian Loftness, University Professor, Paul Mellon Professor
Jennifer Lucchino, Adjunct Faculty
Jakob Marsico, Adjunct Faculty
Christine Mondor, Special Faculty
Andrew Moss, Adjunct Faculty
Irving Oppenheim, Professor
Paul Ostergaard, Adjunct Faculty
Trevor Patt, Thomas Visiting Assistant Professor
José Pertierra-Arrojo, Special Faculty
Matthew Plectic, Adjunct Faculty
Stephen Quick, Adjunct Faculty
Sarah Rafson, Adjunct Faculty
Annie Ranttila, Adjunct Faculty
Nida Rehman, Lucian and Rita Caste Assistant Professor in Architecture and Urban Design
Manuel Rodríguez Ladrón de Guevara, Studio Instructor & Research Assistant
Jinmo Rhee, Graduate Instructor
Noreen Saeed, Graduate Instructor
Azadeh Omidfar Sawyer, Assistant Professor
Diane Shaw, Associate Professor
Scott Smith, Adjunct Faculty
Francesca Torello, Special Faculty
Jet Townsend, Adjunct Faculty
Valentina Vavasis, Special Faculty
Pedro Veloso, Graduate Instructor
Spike Wolff, Special Faculty, Curator
Heather Workinger Midgley, Adjunct Faculty