

UNIVERSITY OF WASHINGTON COLLEGE OF BUILT ENVIRONMENTS DEPARTMENT OF ARCHITECTURE

DESIGN COMPUTING CERTIFICATE

The Design Computing Certificate recognizes M.Arch students¹ who devote a significant portion of their studies to digital media and computational techniques in architectural design. The Certificate recognizes their advanced knowledge and skills—preparation for leadership positions at the intersection of architectural design and information technology. Within the Certificate itself are five opportunities for particular focus: visualization, simulation, fabrication, representation, and theory.

CERTIFICATE REQUIREMENTS

The Certificate can be completed within the Master of Architecture (M.Arch) professional degree program through 15 credits of coursework taken in at least three of the focus areas shown below. In addition, your thesis topic or content should reflect one of them, and your thesis committee must be chaired by a design computing faculty member.

Focus Areas

Visualization
Simulation
Fabrication
Representation
Theory

Note: To receive Certificate recognition you must fill out a “Certificate completion” form prior to graduation. Check with your advisor for deadlines.

¹ Students wishing to pursue this field in depth should consider applying to the Department’s Master of Science in Architecture program in Design Computing.

COURSES BY FOCUS AREA:

Visualization

ARCH 481 3D Modeling and Rendering (3) Lectures and weekly exercises focus on understanding and applying the underlying principles of 3D computer graphics and rendering software. Topics include user-interface, data creation and modeling, lighting models, smoothing, texture mapping, ray tracing, radiosity, animation, and solid modeling. Prerequisite: ARCH 380.

ARCH 581 Advanced Rendering (3) Advanced rendering tools use computer models to simulate the complex physical processes to generate digital images that can mimic the physical world and predict the final appearance of a design. The objectives are to 1) Provide the opportunity for guided explorations and discussions of the technical features of advanced tools and algorithms within the domain of the architectural visualization. 2) Provide hands-on experience with various rendering tools.

Simulation

ARCH 533 Advanced Environmental Controls (3) Evaluation is a part of the iterative design process. It is a measure of how well a given design solution or proposed design alternatives fulfill the expected performances. The objectives of the course are to: 1) Provide the knowledge and hands-on experience of a computational simulation of building performance (solar, lighting, thermal, acoustical analysis). 2) Utilize a visual calculation feedback that can support early stage conceptual design as well as final design prediction.

ARCH 582 Computational Lighting Design (3) Computational Lighting Design is an innovative course that draws from recent developments in lighting simulation, visualization, per-pixel data measurement and analysis techniques. It provides the student with an understanding of the theoretical aspects of computer applications for lighting design and analysis; and the practical knowledge of tools and techniques that enhance the integration of the lighting analysis into the architectural design process.

Fabrication

ARCH 498 Intro to Digital Design & Fabrication (3) Fundamentals of digital fabrication technologies and the related software, with special attention to requirements and opportunities for craft and design expression.

ARCH 498 Digital Design for Fabrication & Construction (3) This course pays particular attention to digital design systems and the development of parameterized models and their subsequent fabrication or construction.

ARCH 485 Digital Craft Workshop: Advanced Projects in Fabrication (3) Advanced projects in digital design and fabrication for students who have completed the introductory fabrication courses and wish to develop a project further.

Representation

ARCH 478 CAD and Working Drawings (4) Intensive introduction to computer-aided design systems for developing construction documentation (working drawings). Lectures and exercises focus on learning the methodology for using CAD to efficiently prepare working drawings, as well as discussions regarding industry recognized standards and current technology used in the preparation of documentation. Prerequisites: ARCH 380, CM 313.

ARCH 482 Web Weaving (3) Examines the function, limitations, and uses of primary World Wide Web technologies and fundamental Web site design and implementation. Participants develop hands-on design/build expertise for Web site design, implementation, and maintenance using readily available tools and techniques. Looks beyond today and explores emerging Internet technologies.

ARCH 486 Computational Geometry (3) Introduction to computer programming and use of scripting for algorithmic generation of designs, the foundations of generative design and form-finding. Significant lab time required.

ARCH 498 Building Information Modeling (3) Introduction to BIM, construction documents, and related issues. Prerequisites: ARCH 380, CM 313.

Theory

ARCH 484 Design Computing Seminar (3) Discusses design computing research and report on ongoing project progress, with demonstrations and guest speakers. Explores design computing, design thinking and design process, and inventing new computer aided tools for design.

ARCH 587 Theory of Design Computing (3) Examines the relationship between theory of design and computational tools for practice. Explores how the emergence of computers as a mainstream tool in design has already changed architectural practice. Discusses how, as with other technologies that revolutionized the practice of architecture, information technologies carry hidden implications about design process and products.

ARCH 588 Research Practice (3) Provides the opportunity for a guided preliminary exploration and refinement of a research topic in design computing. Weekly seminar meetings focus on the review of principles, theories, and methods that underlie the applications of computational research in architecture, focusing on student work with regular presentations and discussions.

FREQUENTLY ASKED QUESTIONS:

Can I combine this with other certificate programs?

Yes. As long as your coursework satisfies the requirements for the Certificate in Design Computing, and your thesis topic and committee fit these guidelines, they may simultaneously satisfy other certificates, but check with your advisor to make sure.

Does the Certificate appear on my UW transcript?

No. However, many employers recognize the value of the skills covered by the Certificate when included on your résumé, and the department records Certificate holders on its website.

Can an undergraduate earn the Certificate?

Not at this time.

Is this the same as the evening certificate in Fabrication?

No. UW Outreach offers an extra-cost "certificate" in Fabrication, with some similar content, for non-matriculated students. This certificate is intended to meet the similar need among matriculated students, at no added cost.

Do "required" courses count towards the Certificate?

Yes. Courses such as Arch 533 (which is required of all M.Arch. students) do count towards the certificate.

Is the Certificate the same as the Master of Science (MS) Program in Design Computing?

No. The MS in Architecture program in Design Computing is a 5-6 quarter advanced-study option that includes many of these same courses, but offers overall greater depth.

Would getting the Certificate while an M.Arch. student shorten time spent in the MS program?

Maybe. The University permits up to 15 credits taken under one degree stream to be applied to another. Speak with an advisor if you're interested.

What about independent studies and 498s?

Maybe. This is a rapidly evolving area of course and technical development and we are aware of that. If you are concerned, check with an advisor to find out if a particular Arch 499, 600, or 498 will count towards the Certificate.

For more information contact:

Claudine Manio, Graduate Program Advisor
claudine@uw.edu