DEPARTMENT OF ARCHITECTURE / COLLEGE OF BUILT ENVIRONMENTS

MASTER OF SCIENCE IN ARCHITECTURE (DESIGN TECHNOLOGY)

CURRICULUM

45 credits: 24 credits of required courses + 21 credits minimum of selective courses relevant to student's research

The Master of Science in Architecture / Design Technology program provides the opportunity for architects, engineers, and other qualified individuals to pursue advance research on topics that include design computing, building performance simulation, sustainable systems and design, high-performance buildings, materials and fabrication, structural analysis, life cycle analysis, food-water-energy nexus, and other related topics.

The overarching purpose of the Master of Science degree in Architecture is to make high-quality graduate education available to individuals who already hold baccalaureate and/or professional degrees in architecture or related fields to broaden and improve their intellectual, professional, and technical capabilities. This degree has started in 2001 as the MS in Architecture stream in Design Computing, and in 2020 the program has been renamed to MS in Architecture stream in Design Technology. Computing remains as a research area for the program, but the program is now broadened to include the other technical fields in architecture in response to the changing demands of our profession. There is a specific and clear need to educate students that have increased skill and knowledge in computation and technical areas to enhance their ability to contribute to professional practice, allowing them to seek higher-level positions, pursue Ph.D. education or professional practice in specialized areas in architecture and allied disciplines. The degree can be completed in 5-6 quarters (two years).

Required Courses: 24 credits

The degree can be completed in 5-6 quarters (two years).

YEAR 1

AUTUMN QUARTER

ARCH 586 Computational Design Technology Seminar (3 credits)

WINTER QUARTER

ARCH 598 Computational Design (3 credits)

+ ARCH 600 Independent Research (2 credits)

Together these courses replace the 5 credit ARCH 597 Research Practicum.

SPRING QUARTER

ARCH 592 Research Methods (3 credits)

YEAR 2

AUTUMN QUARTER

ARCH 599 Thesis Research Prep (4 credits)

WINTER QUARTER

ARCH 700 Master's Thesis (9 credits)

SPRING QUARTER

ARCH 700 Master's Thesis – *if additional time is needed* (2 credits min)

Selective Courses: 21 credits

Selectives must be graduate courses (400-level and higher) related to student's research. Regularly offered courses from the Department of Architecture are listed on the following pages. Courses outside of the Department may count towards degree with approval of the program director.

Full time enrollment (minimum 10 credits) is required each quarter for financial aid or scholarship disbursement. Full time enrollment is mandatory for international student F1/J1 visas. Tuition is the same from 7-18 credits.

Contact Info

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Descriptions of Required Courses

ARCH 586: Computation and Design Technology Seminar (3 credits)
Explores relationship between design technology and computational tools, and how the emergence of computation as a mainstream tool in design is changing architectural practice and design technology research. Discusses how information technologies carry implications and opportunities in the design process, representation, and end products.

ARCH 592: Research Methods (3 credits)
Role and practice of research methods in architecture related to themes of product, process, and performance. Explores the idea of research as a practice unique to architecture in order to discover how innovative approaches and/or outcomes emerge from generating, reinterpreting, and/or rediscovering information from a critical and creative perspective.

ARCH 597: Research Practicum (5 credits)
Designed for students in the MS Program to develop a clear framework to conduct their research. Provides a mentored research opportunity where students apply their research and writing skills and knowledge of methods and theory to an advanced research topic.

> **In 2025-26** this 5-credit requirement will be satisfied with a combination of ARCH 598 Computational Design (3 credits) and ARCH 600 Independent Research (2 credits) supervised by program director, Tomás Méndez Echenagucia.

ARCH 599: Independent Thesis Research and Preparation (4 credits)
Explores development of a proposal for thesis-level research. Participants identify a research area, find relevant literature and prepare an annotated bibliography, articulate a specific question within the research area, and write, present, and defend a proposal. Participants may use this course to develop a thesis proposal.

ARCH 700: Master's Thesis (9 credits, minimum)
This capstone to the Master of Architecture is a student-initiated, faculty supervised and department-approved project. Topics vary and are developed in concert with supervising faculty.

Design Technology Selectives

List of Eligible Selective Courses – consult with program director for additional courses available outside of our department. Contact academic adviser, for Course Offerings schedule for the current academic year.

ARCH 481 – 3D Modeling & Rendering
ARCH 487 – Fundamentals of BIM
ARCH 527 – Intro to Digital Design & Fabrication
ARCH 528 – Digital Design for Fabrication
ARCH 529 – Advanced Digital Projects
ARCH 530 – Integrated Systems
ARCH 523 – Design Technology IV
ARCH 524 – Design Technology V
ARCH 525 – Life Cycle Assessment and Arch.
ARCH 526 - High Performance Buildings
ARCH 534 – Green Technology
ARCH 535 – Daylighting Design Seminar
ARCH 536 – Designing Living Systems
ARCH 537 – Traditional Building Methods
ARCH 582 – Computation Lighting Design
ARCH 598 – Augmented Intelligence and Sustainable Design
ARCH 598 – Biophilic Design
ARCH 598 – Computational Design
ARCH 598 – Energy Simulation: Tools and Methods for Sustainable Design
ARCH 598 – Performative Driven Design
ARCH 598 – Sustainable Design Case Studies

Course Offerings outside of the College of Built Environments

Courses taken outside the Architecture department require pre-approval from the MS Design Technology program director.
Registration for courses outside our department prioritizes degree-seeking students in these programs. Courses that receive a lot of interest from non-majors will post instructions for non-major registration in the UW Time Schedule course notes. If no instructions are provided, contact the department for non-major registration procedures. Here is a directory of graduate programs and contact information: https://www.grad.washington.edu/admission/find-a-program/

Course descriptions below as posted on UW course catalog: https://www.washington.edu/students/crscat/inde.html
This list is a sample of course offerings. Students should explore UW MyPlan or the Time Schedule for additional offerings.

CM 515 – Virtual Construction Management
Examination of innovative techniques for planning and managing construction projects including use of time-phased, three-dimensional Building Information Models; sustainable construction techniques; and web-based project management tools.

CSE 583 – Software Development for Data Scientists (4) (no prerequisites) *Beck*
Provides students outside of CSE with a practical knowledge of software development that is sufficient to do graduate work in their discipline. Modules include Python basics, software version control, software design, and using Python for machine learning and visualization.
Some statistics work would be valuable. Sample applied statistics courses include:

> **Q SCI 482 Statistical Inference in Applied Research I: Hypothesis Testing and Estimation for Ecologists and Resource Managers (5) NW *I. Ganguly***
> *Analysis of variance and covariance; chi-square tests; nonparametric procedures multiple and curvilinear regression; experimental design and power of tests. Application to biological problems. Use of computer programs in standard statistical problems. Prerequisite: either STAT 311 or Q SCI 381.*
>
> **CESI 524 Statistical Methods for Construction (1)**
> *Overview of basic statistical measures used in construction and materials decision making including data distributions, hypothesis testing, regression analysis, sampling and quality control/assurance. Credit/non-credit only.*

M E 515 Life Cycle Assessment (3) *Cooper*
Presents and discusses the computation structure and data sources for environmental Life Cycle Assessment. Uses Life Cycle Assessment to analyze materials, products, and services. The analysis either identifies opportunities for improvements or selects a superior alternative on the basis of pollution prevention and resource conservation. Offered: W.

ENVIR 502 Business Strategy and the Natural Environment (4)
Applies economic and business principles (marketing, accounting, operations) to understand interactions between business and the natural environment and how environmental issues influence business strategy. Theory and case studies explore strategies that both respond to and seek competitive advantage from firms' interactions with the environment.

ENVIR 500 Graduate Seminar in Environmental Studies (15, max. 15)
Exploration of interdisciplinary themes in environmental science communication. Topics vary.

CEWA 560 Risk Assessment for Environmental Health Hazards (4)
Examines context, methodologies, data, uncertainties, and institutional arrangements for risk assessment. Qualitative and quantitative approaches to identification, characterization, and control of environmental hazards to health emphasized through didactic and case studies. Offered: jointly with ENV H 577/PUBPOL 589; A.

CSE 440 Introduction to HCI: User Interface Design, Prototyping, and Evaluation (5)
Human-Computer Interaction (HCI) theory and techniques. Methods for designing, prototyping, and evaluating user interfaces to computing applications. Human capabilities, interface technology, interface design methods, and interface evaluation tools and techniques. Prerequisite: CSE 332.DXARTS 470 Sensing &Control Syst for Dig Arts (5)

HCDE 418 Advanced Projects in Human Centered Design and Engineering (5, max. 10)
Explores advanced topics in human centered design. Students engage with and discuss an advanced topic and then apply it by researching, designing, and implementing a solution to a design challenge. Team-based investigations culminate in a project response to the challenge. Prerequisite: either HCDE 318, INFO 360, or CSE 440; recommended: Students should have completed at least one project-based human centered design or human-computer interaction course (e.g., HCDE 318).

HCDE 455 User Interface Design (4)
Design oriented to cover fundamentals of user interface design; models on human computer interaction, software psychology, input devices, usability, cognitive and perceptual aspects of human-computer interaction, advanced interface, and research methodologies are discussed. Offered: jointly with IND E 455

IND E 455 User Interface Design (4)
Design oriented to cover fundamentals of user interface design; models on human computer interaction, software psychology, input devices, usability, cognitive and perceptual aspects of human-computer interaction, advanced interface, and research methodologies are discussed. Offered: jointly with HCDE 455

IND E 549 Research Methods in Human Factors (3)
Includes fundamental guidelines for survey design, controlled experiments, quasi-experimental, and observational studies. Focus on safety, productivity, functionality, and usability. Review of journal articles on research methods and design issues, given functional, psychological, physiological, and environmental constraints. Recommended: introductory class in human factors.

Design Technology Faculty

Narjes Abbasabadi, *Assistant Professor, Ph.D. in Architecture, Illinois Institute of Technology.* Research interests: sustainable design, computation, building performance simulation, urban building energy modeling, artificial intelligence and machine learning.

Heather Burpee, *Research Associate Professor. Master of Architecture, University of Washington.* Research interests: High-performance buildings, sustainable systems and design, energy efficiency.

Rob Corser, *Associate Professor. Master of Design, Harvard University.* Research interests: Relationships between design and technology in architecture, largely in terms of the integration of new technologies in design, fabrication and construction practices.

Elizabeth Golden, *Associate Professor. Master of Science in Advanced Architectural Design from Columbia University GSAPP*. Research methods: Local and traditional materials and methods in contemporary architecture.

Mehlika Inanici, *Professor. Ph.D. in Architecture, University of Michigan.* Research Interests: Computational lighting design and analysis, building performance simulation, circadian lighting, sustainable systems and design. Director of MS in Architecture Design Technology stream.

Chris Meek, *Professor. Master of Architecture, University of Washington.* Research Interests: Daylighting design, High-performance buildings, sustainable systems and design. Director of Circular City + Living Systems Lab (CCLS). Director of the Integrated Design Lab (IDL) and the Center for Integrated Design.

Tomas Mendez Echenagucia, *Assistant Professor, Ph.D. in Architecture and Building design, Politecnico di Torino*. Research Interests: Computational geometry for sustainable buildings. Search and optimization methods for architectural, structural, acoustic, and energy efficiency.

Rob Pena, *Associate Professor, Master of Architecture, University of California, Berkeley*. Sustainable Design and Building Performance Systems, High Performance Buildings.

Gundula Proksch, *Associate Professor, Master of Architecture, Cornell University*. Research interests: Food-water-energy nexus, a design and representation and their interdependence in the design process. Director of Circular City + Living Systems Lab (CCLS), an interdisciplinary research group investigating transformative strategies for sustainable urban futures.

Kate Simonen, *Professor. Master of Architecture, University of California, Berkeley.* Research Interests: Environmental life cycle assessment (LCA), integrated practice and innovative construction materials and methods. Director of the Carbon Leadership Forum, an industry-academic collaborative research effort focused on linking LCA to design and construction practice to advance low carbon construction.

Tyler Sprague, *Assistant Professor, Ph.D. in Built Environments, University of Washington*. Research interests: the intersection of architecture and structural engineering, through a variety of methods, throughout history.