

# Design

The Berkeley Master of Design (MDes) is a three-semester, professional graduate degree that prepares students to work in creative and technical roles for designing products, services and environments enabled by emerging technologies. The MDes is jointly offered by the College of Engineering (COE) and the College of Environmental Design (CED); this collaboration is reflected in the interdisciplinarity of the program's faculty, student body, curriculum, and pedagogical approaches.

The program's interdisciplinary curriculum connects technical rigor, design theory, and social practice and prepares students for a broad range of creative and technical roles for designing innovative products, services, and environments. Graduates leave the program as engaged and responsive social practitioners, with a deep understanding of the foundations of design and emerging technology and an informed awareness of people, contextual needs and societal impacts.

Housed at the Jacobs Institute for Design Innovation, the MDes provides a dynamic, hands-on curriculum that uniquely equips students to develop a critical perspective and navigate a range of technical languages and design methodologies. Studio-based coursework integrates programming, human-centered design process, and communication with hardware and software development. Exploratory project briefs encourage students to use design process to identify new problem spaces and to explore ideas through co-creative processes, iteration, and prototyping. A set of theory courses help shape students' critical lens on design through analysis and discussion of the implications of practice within an evolving environmental and socio-technology landscape. Students further deepen their knowledge through technical electives and offerings in social practice or entrepreneurship relevant to their personal interests and career goals. The MDes students' studies culminate in a Thesis Studio where they work in teams and bring their distinct perspectives to bear on applied projects.

The MDes is designed for early to mid-career professionals with an interest in pursuing graduate work at the intersections of design and technology. MDes students come from diverse academic and professional backgrounds, and are motivated by the opportunity to immerse themselves in a vibrant, creative, interdisciplinary, and impact-driven design community.

Strong applicants will be able to articulate and demonstrate their interest in design as a creative, goal-oriented activity that contributes to the emergence of innovative, socially impactful new technologies and environments. Possible areas of relevant prior experience include, but are not limited to, academic, professional, or personal work in technology, social or environmental policy, entrepreneurship, and/or community engagement. Strong applicants will also be able to articulate and demonstrate their interest in working with diverse communities and learning from different disciplinary/personal backgrounds and perspectives.

All applicants must have requisite technical preparation, for example a technical degree, coursework, and/or certificate, or equivalent professional experience, because MDes students are expected to be capable of independently learning new software tools and programming languages, and to quickly deploy these tools and skills in courses and projects. Applicants without clear technical preparation from their academic or professional background should, at a minimum, develop intermediate programming experience prior to the start of the program,

and have sufficient knowledge of some technical subject area at the level required to pass a technical elective (<https://design.berkeley.edu/electives/>).

## Application Criteria

For detailed information about the MDes program's application criteria, process and timeline, visit the MDes Apply page (<https://design.berkeley.edu/admissions/apply/>).

## Graduate Division Admissions

### Applying for Graduate Admission

Thank you for considering UC Berkeley for graduate study! UC Berkeley offers more than 120 graduate programs representing the breadth and depth of interdisciplinary scholarship. The Graduate Division hosts a complete list (<https://grad.berkeley.edu/admissions/choosing-your-program/list/>) of graduate academic programs, departments, degrees offered, and application deadlines can be found on the Graduate Division website.

Prospective students must submit an online application to be considered for admission, in addition to any supplemental materials specific to the program for which they are applying. The online application and steps to take to apply can be found on the Graduate Division website (<https://grad.berkeley.edu/admissions/steps-to-apply/>).

## Admission Requirements

The minimum graduate admission requirements are:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A satisfactory scholastic average, usually a minimum grade-point average (GPA) of 3.0 (B) on a 4.0 scale; and
3. Enough undergraduate training to do graduate work in your chosen field.

For a list of requirements to complete your graduate application, please see the Graduate Division's Admissions Requirements page (<https://grad.berkeley.edu/admissions/steps-to-apply/requirements/>). It is also important to check with the program or department of interest, as they may have additional requirements specific to their program of study and degree. Department contact information can be found here (<https://guide.berkeley.edu/graduate/degree-programs/>).

## Where to apply?

Visit the Berkeley Graduate Division application page (<http://grad.berkeley.edu/admissions/apply/>).

The Master of Design (MDes) program requires eight core courses and four electives (see below) for a minimum of 39 credits for the degree.

## Required Courses

DES INV 200	Design Frameworks: History & Methods	3
DES INV 201	Debates in Design	3
DES INV 202	Technology Design Foundations	4
DES INV 210	Studio Foundations	3
DES INV 211	Designing Emerging Technologies I	5
DES INV 213	Thesis Studio	6

DES INV 218	Thesis Seminar	1
DES INV 219	Capstone Portfolio	2

## Elective Courses

The MDes requires four electives, which must include at least one technical elective, one entrepreneurship or social practice elective from the approved lists of courses, shown below. The final two electives may be either additional electives from the approved list (technical, social practice, or entrepreneurship) or another 3 or 4 unit upper division or graduate level course offered at UC Berkeley, subject to enrollment availability. Students may submit petitions for new elective courses to the MDes Education Committee.

### Approved Technical Electives

ARCH 249	Special Topics in the Physical Environment in Buildings	1-4
ARCH 252	Form and Structure	3
ARCH 259	Special Topics in Building Structures	1-4
ARCH 269	Special Topics in Construction and Materials (Indoor Microbiome, Detoxification, and Artificial Intelligence and Matter; Plant Fibers and Design: Origins and Future; Timber Frame and Mass Timber Construction )	1-4
ART 172	Advanced Digital Media: Computer Graphics Studio	4
ART 173	Electro-Crafting	4
CIV ENG 190	Special Topics in Civil and Environmental Engineering	1-4
COMPSCI 161	Computer Security	4
COMPSCI 169A	Introduction to Software Engineering	4
COMPSCI 188	Introduction to Artificial Intelligence	4
COMPSCI 194	Special Topics (Data Engineering)	1-4
COMPSCI 184	Foundations of Computer Graphics	4
or COMPSCI 284A	Foundations of Computer Graphics	
COMPSCI 188	Introduction to Artificial Intelligence	4
COMPSCI 260A	User Interface Design and Development	4
COMPSCI 260B	Human-Computer Interaction Research	3
COMPSCI 284A	Foundations of Computer Graphics	4
COMPSCI 287H	Algorithmic Human-Robot Interaction	4
COMPSCI 289A	Introduction to Machine Learning	4
COMPSCI 294	Special Topics (Intro to Computer Vision and Computational Photography)	1-4
COMPSCI 297	Field Studies in Computer Science ( Immersive Computing and Virtual Reality)	12-0
COMPSCI C200A	Principles and Techniques of Data Science	4
COMPSCI C249A	Introduction to Embedded Systems	4
CY PLAN 257	Data Science for Human Mobility and Socio-technical Systems	4
DATASCI 207	Applied Machine Learning	3
DATA C200	Principles and Techniques of Data Science	4
ENGIN 150	Basic Modeling and Simulation Tools for Industrial Research Applications	4
INFO 247	Information Visualization and Presentation	4
INFO 251	Applied Machine Learning	4
INFO 253A	Front-End Web Architecture	3

INFO 253B	Back-End Web Architecture	3
INFO C262	Theory and Practice of Tangible User Interfaces	4
INFO 271B	Quantitative Research Methods for Information Systems and Management	3
INTEGBI/BIO ENG/MEC ENG C217	Biomimetic Engineering -- Engineering from Biology	3
MAT SCI 200A	Survey of Materials Science	4
MEC ENG 236U	Dynamics and Control of Autonomous Flight	3
MEC ENG 270	Advanced Augmentation of Human Dexterity	4
MEC ENG 280A	Introduction to the Finite Element Method	3
MEC ENG 292C	Advanced Special Topics in Design	1-4
MEC ENG C178	Designing for the Human Body	4
MEC ENG C201	Modeling and Simulation of Advanced Manufacturing Processes	3
MUSIC 158A	Sound and Music Computing with CNMAT Technologies	4
MUSIC 159	Computer Programming for Music Applications	4
NWMEDIA 190	Special Topics in New Media (Advanced Digital Animation)	1-4
NWMEDIA C203	Critical Making	4
NWMEDIA/INFO C262	Theory and Practice of Tangible User Interfaces	4

### Approved Entrepreneurship Electives

ENGIN 183	Special Topics in Technology Innovation and Entrepreneurship	1-4
ENGIN 183C	Challenge Lab	4
ENGIN 183D	Product Management	3
ENGIN 183E	Technology Entrepreneurship	3
ENGIN 283	Special Topics in Technology Innovation and Entrepreneurship	1-4

### Approved Social Practice Electives

ARCH 209	Special Topics in Architectural Design (Virtual Reality: Theory and Representation; Special Topics in Architectural Design: Housing as Design Generator; Contradictions in Disaster and Resilience)	3
ARCH 239	Special Topics in Architecture Design Theory and Criticism (Design Dispossession and Dissent)	1-4
ARCH 279	Special Topics in the History of Architecture (Design Radicals)	1-4
ART 160	Special Topics in Visual Studies (Social Practices; Making and Exhibiting Art in Pandemic Times)	4
ART 163	Social Practice: Critical Site and Context	4
CY PLAN 190	Advanced Topics in Urban Studies (Ghosts and Visions)	1-4
CY PLAN 205	Introduction to Planning and Environmental Law	3
CY PLAN 207	Land and Housing Market Economics	3
CY PLAN 216	Active Transportation	3
CY PLAN 255	Urban Informatics and Visualization	3
CY PLAN 257	Data Science for Human Mobility and Socio-technical Systems	4
CY PLAN C213	Transportation and Land Use Planning	3
CY PLAN C217	Transportation Policy and Planning	3
CY PLAN C251	Environmental Planning and Regulation	3

LD ARCH C231	Environmental Planning and Regulation	3
NWMEDIA 151ACT	Transforming Tech: Issues and Interventions in STEM and Silicon Valley	4
NWMEDIA 200	History and Theory of New Media	4
NWMEDIA 201	Questioning New Media	3
NWMEDIA 204	Critical Practices: People, Places, Participation	4
NWMEDIA 205	Locative Media	4
NWMEDIA 290	Special Topics in New Media (Locative Media)	1-4
NWMEDIA C166	Critical Practices: People, Places, Participation	4
NWMEDIA C265	Interface Aesthetics	3
SOCIOL 127	Development and Globalization	4
<b>Approved Design Electives (may be taken as free/open elective)</b>		
ARCH 209	Special Topics in Architectural Design (Architecture and Landscape)	1-4
ARCH 229	Special Topics in Digital Design Theories and Methods	1-4
ARCH 269	Special Topics in Construction and Materials (Constructing Interior Objects)	1-4
INFO 213	Introduction to User Experience Design	4
INFO 214	User Experience Research	3
INFO 215	Product Design Studio	3
INFO 283	Course Not Available	3

The MDes prepares students to work in creative and technical roles designing products, services, experiences, and environments. The diversity of the MDes student body is mirrored in the exciting and varied professional roles that graduates step into beyond the program. Alongside that tremendous richness in career trajectories, MDes students and graduates are all connected by a deep desire to design with humans and the planet at the center of their work, and a passion for leveraging technology to improve lives.

The MDes equips students not just for the jobs of today, but also careers of the future. As the world sees rapid change enabled by emerging technologies, our graduates are expected to work in an ever-expanding set of roles at the intersection of design, technology, and social impact.

An important avenue for professional development in the MDes program is students' participation in Design@Large during the summer between their second and third semesters. Design@Large is a professional development experience that empowers all MDes students to explore potential career directions and gain important professional skills while they are pursuing the degree. Students identify and engage in an immersive experience outside of an MDes course or studio and apply what they have learned in a broader context, whether that is through an internship, academic research, an independent project, a new start-up, or working in the public sector. For more information and to see examples of students' experiences, please visit the MDes program's dedicated Design@Large (<https://design.berkeley.edu/designlarge/>) page.

The MDes has a Career Development team that is committed to supporting the professional development of students in the program. The career support that is provided to MDes students and alumni include: one-on-one unlimited career coaching sessions, rich offering of design industry engagements, dedicated mentors, career development workshops, Slack access for life and professional development funding.

The MDes is designated as a STEM program and its graduates are eligible for STEM-OPT.

## DES INV 200 Design Frameworks: History & Methods 3 Units

Terms offered: Fall 2024, Spring 2024, Spring 2023

This course exposes students to the mindset, skillset and toolset associated with design, and interweaves practical design methods with readings and lectures on the history of design and technology.

### Hours & Format

**Fall and/or spring:** 15 weeks - 1.5 hours of lecture and 1.5 hours of discussion per week

### Additional Details

**Subject/Course Level:** Design Innovation/Graduate

**Grading:** Letter grade.

## DES INV 201 Debates in Design 3 Units

Terms offered: Spring 2025, Fall 2024, Fall 2023

As today's most pressing challenges cut across disciplinary boundaries, designers need to articulate new methods for connecting conceptual knowledge with technical skills and develop new ways of integrating ideas from various perspectives and world views. Each year students in this colloquium-style course explore a topic in design. Invited lecturers present a relevant project or challenge from their professional careers at a given intersection of critical contemporary issues expressed at a particular scale of design practice. Speakers share background material or readings in advance, allowing students to arrive with thoughtful questions and discussion points. Students compose written reflections throughout and following each speaker.

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit up to a total of 1 time.

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 1 hour of colloquium per week

### Additional Details

**Subject/Course Level:** Design Innovation/Graduate

**Grading:** Letter grade.

## DES INV 202 Technology Design Foundations 4 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

This course introduces foundational design and technology frameworks and builds skill sets essential to the design of products, services, and experiences enabled by emerging technologies. It follows a human-centered design process that includes research, concept generation, and prototyping, with an emphasis on iteration and refinement. It also develops fluency across a range of core technologies, from fabrication to micro-controllers, and how to operationalize them within a design context. These activities are supported by regular practice of design critique. Students engage with a highly technical semester-long project to create a product-service system leveraging both hardware and digital technologies that addresses a well-defined need.

### Objectives & Outcomes

**Course Objectives:** Students are expected to build fluency in the following skill sets through Technology Design Foundations:

- # Iteratively prototyping a range of physical and interactive concepts;
- # Validate hypotheses using technical and experiential prototypes, and statistical methods;
- # Visually and experientially communicating design concepts to inspire audiences and solicit feedback.
- # design ideation;
- # establishing empathy for users and stakeholders;
- # framing complex problems as actionable design opportunities;

**Student Learning Outcomes:** - Communicate both conceptual and concrete ideas effectively, using a range of visual and verbal presentation techniques

- Give form to design ideas through prototyping at a range of fidelities, and using a range of materials and tools, including electronics, to convey specific information about a design idea
- Lead key steps in an iterative and human-centered design process, including conducting research, uncovering insights, generating ideas, and developing and testing prototypes.
- Work effectively in teams with a toolkit of resources to support productive teamwork

Upon completing this course, students will be able to:

### Rules & Requirements

**Repeat rules:** Course may be repeated for credit with advisor consent.

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of lecture and 2 hours of studio per week

### Additional Details

**Subject/Course Level:** Design Innovation/Graduate

**Grading:** Letter grade.

## DES INV 210 Studio Foundations 3 Units

Terms offered: Fall 2024, Fall 2023

Studio Foundations introduces students to the key concepts of a design studio and the foundational principles and methods that inform the ways designers work, collaborate, and practice.

### Rules & Requirements

**Prerequisites:** This course is only open to students in the first year of the Master of Design (MDes) program. There are no other prerequisites

### Hours & Format

**Fall and/or spring:** 15 weeks - 2-3 hours of lecture and 1.5-2.5 hours of studio per week

### Additional Details

**Subject/Course Level:** Design Innovation/Graduate

**Grading:** Letter grade.

## DES INV 211 Designing Emerging Technologies I 5 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023

This course is an intensive, project-based course that focuses on design of interactive artifacts that use emerging technologies. Students are led through a sequence of projects of varying lengths (from one week to three weeks). This serves as the first in a two part sequence of courses (with DES INV 212) intended to develop student skills in designing with technology as a material. Projects include both individual and team activities, with teams frequently changing in size and composition.

### Rules & Requirements

**Prerequisites:** Students must have either completed or be concurrently enrolled in DES INV 202: Technology Design Foundations and DES INV 200: Design Frameworks

### Hours & Format

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Design Innovation/Graduate

**Grading:** Letter grade.

**Instructor:** ERIC PAULOS

## DES INV 212 Designing Emerging Technologies II 3 Units

Terms offered: Fall 2022, Spring 2022

This course is an intensive, project-based course which serves as part of the core required curriculum for students in the Master of Design program. Students are led through a sequence of projects of varying lengths (from one week to one month). The course builds on Designing Emerging Technologies I, and focuses on developing fluency with a different set of technologies. Projects include both individual and team activities, with teams frequently changing in size and composition.

### Rules & Requirements

**Prerequisites:** DES INV 211: Designing Emerging Technologies I

### Hours & Format

**Fall and/or spring:** 15 weeks - 1.5 hours of lecture and 1.5 hours of laboratory per week

### Additional Details

**Subject/Course Level:** Design Innovation/Graduate

**Grading:** Letter grade.

## DES INV 213 Thesis Studio 6 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022

In this final studio course of the MDes program, students develop proposals for novel designed artifacts - which may consist of physical objects, products, services, environments, curios, interfaces, or processes - that employ emerging technologies to produce positive impacts for humans, culture, the environment, or society at large.

Through a guided sequence of progressive milestones of thinking and making, the work of the studio culminates in a final critique, a final exhibition of projects, and a discursive text that documents this process and positions the product in a broader social and technical context.

### Rules & Requirements

**Prerequisites:** This course is only open to students who are in the final semester of the Master of Design (MDes) program and have successfully completed both DESINV 218 Thesis Seminar and DESINV 211 Designing Emerging Technologies with a grade of C- or higher

### Hours & Format

**Fall and/or spring:** 15 weeks - 3.5-4.5 hours of studio, 1.5-2.5 hours of lecture, and 2-2 hours of workshop per week

### Additional Details

**Subject/Course Level:** Design Innovation/Graduate

**Grading:** Letter grade.

## DES INV 218 Thesis Seminar 1 Unit

Terms offered: Summer 2025 10 Week Session, Summer 2024 10 Week Session

This course prepares Master of Design students for the final semester of the program, and emphasizes design research and the pivotal role of the thesis in academic and professional settings. Here, students are equipped with the necessary research and technical writing skills to engage deeply with complex design issues. Special focus is given to mastering literature reviews as a means to critically analyze domain-specific discourses, identify research gaps, and effectively position their work within the vast landscape of design and technology, fostering a foundation for intellectual rigor and innovation in their forthcoming thesis projects.

### Rules & Requirements

**Prerequisites:** This course is only open to students who are in the penultimate term of the Master of Design (MDes) program and have successfully completed DES INV 200 Design Frameworks and DES INV 201 Debates in Design with a grade of C- or higher

### Hours & Format

#### Summer:

6 weeks - 4-6 hours of seminar per week

8 weeks - 1.5-2.5 hours of seminar per week

10 weeks - 1-2 hours of seminar per week

### Additional Details

**Subject/Course Level:** Design Innovation/Graduate

## DES INV 219 Capstone Portfolio 2 Units

Terms offered: Spring 2025, Spring 2024, Fall 2023

In this culminating course for the MDes degree, you compile a portfolio of work that has been completed during the MDes program, selecting at least four meaningful pieces that demonstrate the achievement of key learning objectives and highlight the underlying themes of your course of study. Two projects should be deeper investigations of projects done in previous classes. The third project featured should be a deep dive into the project pursued in studio. The fourth entry of the portfolio should reflect on Design@Large, an experience you have had outside of an MDes course or studio where you have furthered your design knowledge and expertise within a broader context.

### Rules & Requirements

**Prerequisites:** Culminating course taken at the end of the MDes program

### Hours & Format

**Fall and/or spring:** 15 weeks - 2 hours of seminar per week

### Additional Details

**Subject/Course Level:** Design Innovation/Graduate

**Grading:** Letter grade.



## **DES INV 290 Advanced Special Topics in Design Innovation 1 - 4 Units**

Terms offered: Spring 2024, Fall 2023, Spring 2023

Selected advanced topics in design innovation.

### **Rules & Requirements**

**Prerequisites:** Varies by topic. Check syllabus and/or Jacobs Institute website for specific prerequisites

**Repeat rules:** Course may be repeated for credit when topic changes.

### **Hours & Format**

#### **Fall and/or spring:**

7 weeks - 1-8 hours of lecture per week

8 weeks - 1-8 hours of lecture per week

15 weeks - 1-4 hours of lecture per week

#### **Summer:**

6 weeks - 2-10 hours of lecture per week

8 weeks - 2-10 hours of lecture per week

### **Additional Details**

**Subject/Course Level:** Design Innovation/Graduate

**Grading:** Letter grade.