

# Design

The Master of Design (MDes) degree program is a three-semester, professional graduate degree in design that integrates human-centered design with a sophisticated understanding of technology to prepare students to excel in creative practices today and design the thoughtful technologies of tomorrow. Jointly offered by the College of Engineering and the College of Environmental Design, 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.

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 debate-focused seminars help shape students' critical lens on design through analysis and discussion of the ethical, ecological, and societal 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 interests and career goals. Their studies culminate in a Design Studio where they work in teams and bring their distinct perspectives to bear on applied projects.

With support from MDes Career Services, students enhance their academic preparation through Design@Large — an opportunity outside of an MDes course or studio where they apply what they have learned in a professional context, typically in the summer between their second and third semesters (see Professional Development Activities).

The Master of Design (MDes) program requires nine core courses and three electives (see below) for a minimum of 38 credits for the degree.

## Required Courses

DES INV 200	Design Frameworks: History & Methods	3
DES INV 201	Debates in Design (Students are required to take this course twice; once during the fall semester in year one, and again during the fall semester of year two.)	3
DES INV 202	Technology Design Foundations	4
DES INV 211	Designing Emerging Technologies I	5
DES INV 212	Designing Emerging Technologies II	3
DES INV 213	Design Studio	5
DES INV 219	Capstone Portfolio	2
IND ENG 195	A. Richard Newton Lecture Series	1

## Elective Courses

The MDes requires three electives: one technical elective, and at least one entrepreneurship or social practice elective from the approved lists of courses, shown below. The third elective may be either an additional elective from the approved list (technical, social practice, or entrepreneurship) or any 3 or 4 unit upper division or graduate level

course offered at UC Berkeley, subject to enrollment availability. Students may submit petitions for alternate courses to the Executive Director.

### 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
CIV ENG 190	Special Topics in Civil and Environmental Engineering	1-4
COMPSCI 161	Computer Security	4
COMPSCI 169A	Introduction to Software Engineering	3
COMPSCI 188	Introduction to Artificial Intelligence	4
COMPSCI 194	Special Topics (Data Engineering)	1-4
COMPSCI 260B	Human-Computer Interaction Research	3
COMPSCI 184	Foundations of Computer Graphics	4
COMPSCI 284A	Foundations of Computer Graphics	4
COMPSCI 188	Introduction to Artificial Intelligence	4
COMPSCI C200A	Principles and Techniques of Data Science	4
COMPSCI C249A	Introduction to Embedded Systems	4
COMPSCI 260A	User Interface Design and Development	4
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
CY PLAN 257	Data Science for Human Mobility and Socio-technical Systems	4
DATASCI W207	Applied Machine Learning	3
ENGIN 150	Basic Modeling and Simulation Tools for Industrial Research Applications	3
IND ENG 290	Special Topics in Industrial Engineering and Operation Research (Entrepreneurship & Innovation: Data-X (Applied Data Science with Venture Application))	2-3
INFO 253A	Front-End Web Architecture	3
INTEGBI/BIO ENG/MEC ENG C217	Biomimetic Engineering -- Engineering from Biology	3
MAT SCI 200A	Survey of Materials Science	4
MEC ENG 122	Processing of Materials in Manufacturing	3
MEC ENG C201	Modeling and Simulation of Advanced Manufacturing Processes	3
MEC ENG 236U	Control and Dynamics of Unmanned Aerial Vehicles	3
MEC ENG 270	Advanced Augmentation of Human Dexterity	4
MEC ENG 280A	Introduction to the Finite Element Method	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

IND ENG 185	Challenge Lab (Challenge Lab: Emerging Technologies and Social Impact; Challenge Lab: Product Design & Customer Needfinding: Alternative Meat)	4
IND ENG 186	Product Management	3
IND ENG 190E	Advanced Topics in Industrial Engineering and Operations Research: Entrepreneurship & Innovation	1-4
IND ENG 290	Special Topics in Industrial Engineering and Operation Research	2-3

#### 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
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 C213	Transportation and Land Use Planning	3
CY PLAN 216	Active Transportation	3
CY PLAN C217	Transportation Policy and Planning	3
CY PLAN C251	Environmental Planning and Regulation	3
CY PLAN 255	Urban Informatics and Visualization	3
CY PLAN 257	Data Science for Human Mobility and Socio-technical Systems	4
NWMEDIA 151A	Transforming Tech: Issues and Interventions in STEM and Silicon Valley	4
NWMEDIA 200	History and Theory of New Media	4
NWMEDIA C265	Interface Aesthetics	3
NWMEDIA 290	Special Topics in New Media (Locative Media)	1-4

#### Approved Design Electives (may be taken as free/open elective)

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

The Master of Design (MDes) is designed for early to mid-career professionals with an interest in pursuing graduate work at the intersection of design and technology, with applications that might include artistic production, technological innovations, product or communication design, and design experiences or interventions, etc. Competitive applicants have some prior technical preparation and an interest in design as a creative, goal-oriented activity that can contribute to the emergence of innovative new technologies and environments.

## Application Criteria

The following are required for admission to the Berkeley MDes program. The following includes the University's general graduate admission requirements:

- Online Application
- Application Fee
- University Transcripts
- Curriculum Vitae (CV) or Resume, showing relevant work and/or research experience
- Two Essays (personal statement and statement of purpose)
- Three Letters of Recommendation
- Project portfolio, showing previous design work
- English Language Proficiency Requirement (if required)
- The GRE Exam is not required.

In addition, students may be invited for an interview, either in-person or remote, and should be prepared to explain their qualifications, motivations to apply to the program, and goals for the program.

## Portfolio Requirements

All applicants are required to submit a portfolio that demonstrates their creative and technical proficiency. Depending on your individual practice, this may include examples of visual design work, software systems, interactive electronics, videos, paintings, 3D models, ceramics, performances, musical compositions, social practices, or many other types of creative or technical pursuits.

Your portfolio should be legible to a general audience of designers, and should not only present representations of final outcomes/designs in their intended contexts, but also accounts of your design process, and samples of early design iterations. Portfolios are expected to include both images and supporting text and should convey the context from which the project arose and the lens through which to understand and critique the work. Collaborative work is encouraged, but please credit all authors and highlight your specific contribution. Similarly, academic, professional, and personal work are all welcome, but please differentiate these distinct types of work.

In our experience, strong portfolios often opt to describe a limited selection of projects in depth, rather than account for a large breadth of projects superficially. We suggest highlighting between 3–5 of your most compelling exemplars of creative work. The most important role of a portfolio is to clearly communicate your skills, experience, and perspective. Your portfolio must include your name and contact information and be submitted as a stand-alone PDF formatted document. You may submit your portfolio of up to 20 pages maximum and 20MB total PDF file size. Portfolios that are submitted in excess of this page and size restriction will not be reviewed by the admissions committee. Any URLs or links to outside materials within your portfolio or elsewhere in your application will not be reviewed. You may optionally include up to two minutes of additional time-based media (audio/video).

## Graduate Division Admissions

### Minimum Requirements for Admission

The following minimum requirements apply to all graduate programs and will be verified by the Graduate Division:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A grade point average of B or better (3.0);
3. If the applicant has completed a basic degree from a country or political entity (e.g., Quebec) where English is not the official language, adequate proficiency in English to do graduate work, as evidenced by a TOEFL score of at least 90 on the iBT test, 570 on the paper-and-pencil test, or an IELTS Band score of at least 7 on a 9-point scale (note that individual programs may set higher levels for any of these); and
4. Sufficient undergraduate training to do graduate work in the given field.

### Applicants Who Already Hold a Graduate Degree

The Graduate Council views academic degrees not as vocational training certificates, but as evidence of broad training in research methods, independent study, and articulation of learning. Therefore, applicants who already have academic graduate degrees should be able to pursue new subject matter at an advanced level without the need to enroll in a related or similar graduate program.

Programs may consider students for an additional academic master's or professional master's degree only if the additional degree is in a distinctly different field.

Applicants admitted to a doctoral program that requires a master's degree to be earned at Berkeley as a prerequisite (even though the applicant already has a master's degree from another institution in the same or a closely allied field of study) will be permitted to undertake the second master's degree, despite the overlap in field.

The Graduate Division will admit students for a second doctoral degree only if they meet the following guidelines:

1. Applicants with doctoral degrees may be admitted for an additional doctoral degree only if that degree program is in a general area of knowledge distinctly different from the field in which they earned their original degree. For example, a physics PhD could be admitted to a doctoral degree program in music or history; however, a student with a doctoral degree in mathematics would not be permitted to add a PhD in statistics.
2. Applicants who hold the PhD degree may be admitted to a professional doctorate or professional master's degree program if there is no duplication of training involved.

Applicants may apply only to one single degree program or one concurrent degree program per admission cycle.

### Required Documents for Applications

1. **Transcripts:** Applicants may upload *unofficial* transcripts with your application for the departmental initial review. *If the applicant is admitted*, then *official* transcripts of all college-level work will be required. Official transcripts must be in sealed envelopes as issued by the school(s) attended. If you have attended Berkeley, upload your unofficial transcript with your application for the departmental

initial review. *If you are admitted*, an official transcript with evidence of degree conferral *will not* be required.

2. **Letters of recommendation:** Applicants may request online letters of recommendation through the online application system. Hard copies of recommendation letters must be sent directly to the program, not the Graduate Division.
3. **Evidence of English language proficiency:** All applicants who have completed a basic degree from a country or political entity in which the official language is not English are required to submit official evidence of English language proficiency. This applies to institutions from Bangladesh, Burma, Nepal, India, Pakistan, Latin America, the Middle East, the People's Republic of China, Taiwan, Japan, Korea, Southeast Asia, most European countries, and Quebec (Canada). However, applicants who, at the time of application, have already completed at least one year of full-time academic course work with grades of B or better at a US university may submit an official transcript from the US university to fulfill this requirement. The following courses will not fulfill this requirement:

- courses in English as a Second Language,
- courses conducted in a language other than English,
- courses that will be completed after the application is submitted, and
- courses of a non-academic nature.

If applicants have previously been denied admission to Berkeley on the basis of their English language proficiency, they must submit new test scores that meet the current minimum from one of the standardized tests. Official TOEFL score reports must be sent directly from Educational Test Services (ETS). The institution code for Berkeley is 4833. Official IELTS score reports must be sent electronically from the testing center to University of California, Berkeley, Graduate Division, Sproul Hall, Rm 318 MC 5900, Berkeley, CA 94720. TOEFL and IELTS score reports are only valid for two years.

### Where to Apply

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

The goal of the Master of Design (MDes) program is to educate a cohort of designers to have a deep understanding of the foundations of emerging technologies and a rigorous design approach for analyzing ethical, ecological and societal implications of a continuously evolving environmental and socio-technology landscape. To meet this goal, MDes students are expected to:

- Master methods of problem-conception and problem-solving at a range of social and ecological scales.
- Hone methods of implementation grounded in the creative practice of design.
- Gain core design skills, in terms of process, materials, craft, and representation.
- Deepen and expand their technical skills in 1-2 emerging technology areas.
- Explicitly consider contexts and impacts of design decisions.
- Use design as a tool for collaboration and team-work.

- Communicate design ideas effectively to diverse collaborators and audiences.
- Weave all of the above together in multiple practice-focused studios.

As part of enrollment in the program, each MDes student receives a Jacobs Maker Pass for access to Jacobs Hall makerspace and a materials budget each semester to purchase materials from the store at Jacobs Hall. Access to the Fabrication Shop in College for Environmental Design (CED) and to the CITRIS Innovation Lab is also included.

Starting in the second semester of the program, each MDes student is assigned a desk in the MDes studio to support their individual and collaborative work.

MDes students may apply for GSI positions, when they are available, for undergraduate design courses offered at The Jacobs Institute for Design Innovation. These teaching opportunities are optional and MDes students are expected to be able to balance GSI responsibilities with their own educational commitments with little difficulty.

MDes students are expected to complete Design@Large, a professional development requirement for the program. Design@Large requires students to engage in an experience outside of an MDes course or studio where they apply what they have learned in a broader context. Design@Large experience typically takes place in the summer between the Spring and Fall semesters and is uniquely defined to align with students' interests and career goals.

MDes students may satisfy this requirement in the following ways:

- Securing an internship
- Having an international experience
- Contributing to a research project
- Launching or contributing to a new start-up or business
- Working in government, service or non-profit organization

The MDes Program provides Career Services advising and other resources to aid students in their pursuit of internships or other professional opportunities as part of this requirement. It is each student's responsibility, however, to define and identify their Design@Large experience.

MDes students demonstrate the completion of the Design@Large requirement by documenting a project or contribution from their experience in DES INV 219: Capstone Portfolio, a culminating course, required for all MDes students in the last semester of the program.

In this course, students compile a portfolio of work that has been completed during the MDes program, selecting meaningful pieces that demonstrate the achievement of key learning objectives and highlight the underlying themes of their course of study in the program. As part of this documentation, the Capstone Portfolio must also include and reflect on their Design@Large experience.

Expand all course descriptions [+]  
Collapse all course descriptions [-]

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

Terms offered: Spring 2022, Fall 2021

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.

Design Frameworks: History & Methods: [Read More](#) [+]

### 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.

Design Frameworks: History & Methods: [Read Less](#) [-]

## DES INV 201 Debates in Design 3 Units

Terms offered: Fall 2021, Spring 2021

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.

Debates in Design: [Read More](#) [+]

### 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.

Debates in Design: [Read Less](#) [-]



## DES INV 202 Technology Design Foundations 4 Units

Terms offered: Fall 2021, Spring 2021

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.

Technology Design Foundations: Read More [+]

### 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.

Technology Design Foundations: Read Less [-]

## DES INV 211 Designing Emerging Technologies I 5 Units

Terms offered: Spring 2022, Fall 2021

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. Designing Emerging Technologies I: Read More [+]

### 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

Designing Emerging Technologies I: Read Less [-]

## DES INV 212 Designing Emerging Technologies II 3 Units

Terms offered: 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. Designing Emerging Technologies II: Read More [+]

### 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.

Designing Emerging Technologies II: Read Less [-]

## DES INV 213 Design Studio 5 Units

Terms offered: Spring 2022

In this course you will participate in a hands-on design studio focused on key topics of concern related to design and technology innovation. The primary goal of this course is to orient students to fabrication, building technologies, and fundamental design production skills in a studio environment. A key secondary goal is to provide students the opportunity to address a real world problem and provide an application or solution. Themes and project topics, as well as subject matter expertise, are provided by either external partners, including companies, local governmental offices, or nonprofits, or provided by faculty and related to research interests.

Design Studio: [Read More](#) [+]

### Rules & Requirements

**Prerequisites:** Students must be concurrently enrolled in DES INV 219: Capstone Portfolio

### Hours & Format

**Fall and/or spring:** 15 weeks - 6 hours of studio and 2 hours of lecture per week

### Additional Details

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

**Grading:** Letter grade.

Design Studio: [Read Less](#) [-]

## DES INV 219 Capstone Portfolio 2 Units

Terms offered: Spring 2022

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.

Capstone Portfolio: [Read More](#) [+]

### 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.

Capstone Portfolio: [Read Less](#) [-]

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

Terms offered: Spring 2020, Fall 2019

Selected advanced topics in design innovation.

Advanced Special Topics in Design Innovation: [Read More](#) [+]

### 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.

Advanced Special Topics in Design Innovation: [Read Less](#) [-]