

# School of Design

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## Design at Carnegie Mellon

Design is the thoughtful activity that humanizes our environment through visual communication and the shaping of products that help us in our daily lives. Whether in magazines and books, posters and exhibitions, video and film, human-computer interactions, or any of the myriad of everyday products such as furniture, consumer goods, vehicles, or medical equipment, designers play an important role in shaping the form and content of our experience.

Designers are concerned with aesthetics, but they are equally concerned with serving people. This requires more than skill in the fine arts. It also requires knowledge about the needs, desires, expectations, and capabilities of human beings. It requires skills of observation and interpretation that help us understand the people that we want to serve. More than this, however, designers must also understand the technological issues that stand behind effective products. They must understand the materials, tools, and production processes of the modern world. An education in design is an education for the mind as well as the eye and hand.

The undergraduate program enables students to develop specialized skills in the areas of Product (Industrial) Design, Communication (Graphic) Design and Environments (design for physical and digital environments), while providing them with a solid foundation in design studies. Students study systems thinking; the ability to see and solve problems at multiple levels of scale, and situate their work within larger social and environmental contexts.

The over-arching theme of the curricula is *design for interactions*, which acknowledges that 'ecologies' of products and communications often come together within complex physical *and* digital environments. Coursework balances making and theory with the integration of new, emergent technologies. Students are encouraged to explore the scope of design as well as the responsibility and ethics involved in the design of interactions between people, the built world, and the environment.

The curriculum is one that provides students with the ability to customize their degree: they may choose to specialize in one of three areas offered (Products, Communications, Environments), but also have the option of combining any two, to create a unique, interdisciplinary design degree.

The undergraduate curriculum also introduces students to three important areas of design focus: design for service, design for social innovation and transition design. These represent both new and established design approaches to framing and solving problems. In their senior year, students bring their disciplinary specialty (communications, products or environments) to projects that are situated within the areas of design for service and/or design for social innovation.

The School offers a Bachelor of Design with tracks in Communications, Products, or Environments.

### Communications

The ability to communicate and shape meaning is one of the most powerful and ubiquitous forms of design in today's world. Students learn to design effective communications across a wide variety of media that *always* exist within complex webs of interactions between people, products, and environments. Areas of study include narrative and storytelling, information design, and a variety of analog and digital visualization techniques. Students develop the ability to identify specific audiences and communicate to them through effective visual, verbal and aural communications that educate, inform and delight.

They study the dynamic and 'emergent' characteristics of communications in a globally networked society where technologies and modes of individual and mass communication are constantly changing. Students learn systems thinking and engage in an iterative, multi-disciplinary and collaborative design process that involves research, observation, prototyping and rigorous evaluation. Students develop the ability to identify and communicate to specific audiences through effective visual and verbal communications that educate, inform, delight and invite participation.

### Products

Students learn to design products and their interactions within the context of human needs and they develop a deep understanding of the ways in which products shape behavior. Our curriculum acknowledges that no product exists in isolation—it is *always* part of a larger system comprised of people, communications and environments. Within the context of design for service, products exist as 'touchpoints' in a service ecology. For this reason, students learn systems thinking and engage in an iterative, multi-disciplinary and collaborative design process that involves research, observation, modeling/prototyping and rigorous evaluation.

Students are introduced to current production and manufacturing processes as well as sustainable approaches, such as cradle-to-cradle, lifecycle analysis and the use of

new, more environmentally friendly materials. The School has a well-equipped analog and digital prototyping facility where students work with traditional materials such as wood and metal and learn to design and prototype using CAD software and 3D digital printers.

### Environments

Students learn to design for complex environments that exist in the digital, physical and multi-modal realms. Most of the products and communications we interact with are situated within complex physical spaces (our homes, classrooms, places of business, shopping malls, even amusement parks). We also interact with complex online environments such as large websites, social networking and virtual reality environments. And increasingly we interact in 'smart' physical spaces with multi-modal communications in a combination of the analog and the digital.

In our curriculum, environments are seen as integrated and dynamic systems that require the design of interactions at multiple levels of scale. Students acquire a diverse set of skills that includes a deep understanding of spatial relationships, designing *with* and *for* emerging, multi-media technologies and an understanding of the cognitive challenges presented by multi-modal spaces.

Students who focus on the design of environments delve deep into systems thinking and systems dynamics and spend time learning to collaborate and lead within multi-disciplinary teams (solving large problems involving complex spaces almost always involves teams of people from different disciplines).

### Design Minor Program

The School also offers a minor in Design for well-qualified students. Further information on the minor program is provided earlier in the catalog.

## The Design Curriculum

### Minimum units required for Bachelor of Design

360

The design curriculum is for students who are interested in full-time undergraduate study leading to entry-level professional employment or advanced graduate study in the areas of Communication Design, Product Design, or Design for Environments.

The first year is a period of discovery, where students explore studio projects and supporting courses in the ideas and methods of design practice as well as courses in design studies. The second and third years are a period of concentration and development primarily within the student's area(s) of specialization. The fourth year is a period of integration and advanced study, with studio projects involving teams of students from all areas of design. There are studio courses throughout all four years, supported by departmental electives in the ideas and methods of design practice and other courses in the history, theory, and criticism of design. In addition, the School also requires all students to take a substantial number of general education courses offered by other departments throughout the university. General education is an essential part of the education of a professional designer.

### Foundation Year

In their freshmen year, students are introduced to all three areas of design specialty: Product (Industrial), Communication (Graphic) and digital and physical Environments. Here, they explore these unique and complementary areas of design and gain a wide range of skill sets such as systems thinking, iterative process, collaboration and visualization, and work in both two and three dimensional materials as well as digital media.

At the end of their freshman year, students are given the opportunity to begin to focus their interests in two of three design areas (products/communications/environments) and will eventually decide upon a single area of focus or a dual path of study.

This is the first-year curriculum for all design students.

### First Year

Fall		Units
Studio		
51-101	Studio: Survey of Design	9
51-103	Design Workshop I	3
Ideas and Methods		Units
51-121	Visualizing	9
Design Studies		Units
51-171	Placing	9
General Education		Units

76-101	Interpretation and Argument	9
85-102	Introduction to Psychology	9
99-101	Computing @ Carnegie Mellon	3

**Spring**

Studio		Units
51-102	Design Lab	9
51-104	Design Workshop II	3

**Ideas and Methods** Units

51-122	Collaborative Visualizing	9
51-132	Introduction to Photo Design 1st mini	4.5
51-134	Photo Design II 2nd mini	4.5

**Design Studies** Units

51-172	Systems	9
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**General Education** Units

79-104	Global Histories	9
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**Second Year**

Following the first-year program, students select two out of three areas of interest: Products[P], Communications[C], Environments[E]. In the fourth semester students select one of the two areas to study more deeply. Students investigate the relationships people form with designed artifacts and the roles that physical, visual, and digital forms play in our lives. They apply what they learn to the design of products, communications, and environments that facilitate interactions. Students are also required to take general education courses to gain a broad vision of many disciplines and fields of knowledge that are relevant to design.

**Second Year****Fall**

Studio		Units
51-225	Communications Studio I: Understanding Form & Context (Pick two)	4.5, 4.5
or 51-245	Products Studio I: Understanding Form & Context	
or 51-265	Environments Studio I: Understanding Form & Context	

**Ideas and Methods** Units

51-227	Prototyping Lab I: Communications (Pick two corresponding labs)	4.5, 4.5
or 51-247	Prototyping Lab I: Products	
or 51-267	Prototyping Lab I: Environments	
51-2xx	Design Selective (choose from list)	9

**Design Studies** Units

51-271	How People Work	9
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**General Education** Units

xx-xxx	Academic Elective	9
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**Spring**

Studio		Units
51-228	Communications Studio II: Designing Communications for Interactions	9
or 51-248	Products Studio II: Designing Products for Interactions	
or 51-268	Environments Studio II: Designing Environments for Interaction	

**Ideas and Methods** Units

51-208	Research Methods	4.5
51-239	Prototyping Lab II: Communications	9
or 51-249	Prototyping Lab II: Products	
or 51-269	Prototyping Lab II: Environments	

**Design Studies** Units

51-272	Cultures	4.5
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**General Education** Units

xx-xxx	Academic Elective	9
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**Third Year**

In the fifth and sixth semesters, students may choose to continue their fourth semester area of focus, or they may choose to study their second area of study from the third semester. Students study how design functions at various levels of scale and degrees of complexity situated in specific contexts. They design products, communications, and environments that function as cohesive systems that live within the built and social worlds.

**Third Year****Fall**

Studio		Units
51-323	Communications Studio III: Designing for Complex Communication Systems	9
or 51-343	Products Studio III: Designing for Complex Products Systems	
or 51-363	Environments Studio III: Designing for Complex Environment Systems	

**Ideas and Methods (Select one Design Elective)** Units

51-321	Photographic Narrative	9
51-231	Calligraphy I	9
51-257	Introduction to Computing for Creative Practices	10
51-349	Visual Notation/Journaling	9
51-322	Advanced Digital Imaging	4.5
51-335	Mapping and Diagraming	9
51-359	Tools for UX Design	9
51-355	Experimental Sketching	4.5
51-399	Junior Independent Study	Var.

**Design Studies** Units

51-371	Futures	9
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**General Education** Units

xx-xxx	Academic Elective	9
xx-xxx	Free Elective	9

**Spring**

Studio		Units
51-330	Communications Studio IV: Designing Communications for Social Systems	9
or 51-350	Products Studio IV: Designing Products for Social Systems	
or 51-360	Environments Studio IV: Designing Environments for Social Systems	

**Ideas and Methods (Select one Design Elective)** Units

51-322	Advanced Digital Imaging	4.5
51-328	Advanced Web Design	9
51-334	Photography, Community & Change	9
51-344	Advanced Digital Prototyping	6
51-346	Production Prototyping	6
51-376	Semantics & Aesthetics	4.5
51-380	Experiential Media Design	9
51-388	Sharing Economies	9

**Design Studies** Units

51-372	Persuasion	9
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**General Education** Units

xx-xxx	Academic Elective	9
xx-xxx	Free Elective	9

**Fourth Year**

In the senior year, students work to identify their next steps in professional practice, entrepreneurship, or in academia. They apply their design skills and knowledge to client-based and/or self-defined projects that focus on the design of services or social innovation.

The fall semester features the Design Research Studio, a semester-long project where students work in teams applying skill and knowledge learned in Products, Communications, and/or Environments. In the spring the Capstone Project challenges students to work independently on a semester-long project, deepening their understanding of service or social innovation design principles.

## Fourth Year

### Fall

Studio		Units
51-481	Design Research Studio	12
Ideas and Methods (Select one Design Elective)		Units
51-379	Information+Interaction+Perception	9
51-423	Pieces 2.0: Social Innovation: Desis Lab	9
51-441	Foundation of BME Design	6
51-451	Fundamentals of Joinery & Furniture Design (I)	9
51-455	DeXign the Future: Human Centered Innovation for Exponential Times	9
51-499	Senior Independent Study	Var.
General Education		Units
xx-xxx	Academic Elective	9
xx-xxx	Free Elective	9
xx-xxx	Free Elective	9

### Spring

Studio		Units
51-480	Design Capstone Project: Service Design	4.5
or 51-490	Design Capstone Project: Social Innovation	
		4.5
Ideas and Methods (Select one Design Elective)		Units
51-374	Understanding Perception through Design	9
51-427	Advanced Book Arts Workshop	9
51-434	Experimental Form	9
51-442	BME Design Project	9
51-452	Furniture Design II (II)	9
51-478	Speculative Critical Design	9
51-499	Senior Independent Study	Var.
General Education		Units
xx-xxx	Academic Elective	9
xx-xxx	Free Elective	9

## Other Requirements

General education courses should be selected from other departments throughout the university. Students are strongly advised to select a balanced set of general education electives-in addition to Interpretation and Argument, Global Histories and Introduction to Psychology - from three broad areas of study: arts and humanities, social and behavioral sciences, and natural sciences and engineering, including mathematics. While free electives may include studio courses in other departments, academic electives are non-studio (lecture) courses in other departments. Specific recommendations (and general requirements) for electives in all of these areas are available from advisors in the School of Design. The School places strong emphasis on the value of general education for personal growth as well as professional development. General education electives allow a student to obtain a minor in another department or program, such as business, human-computer interaction, IDEATE, engineering, professional and technical writing, or architecture.

Students may enroll for no more than 18 units of independent study courses, and no more than one independent study per semester. A minimum 3.0 GPA is required for independent study. Independent study is permitted only in the third and fourth years of the program. Proposals for independent study courses must be developed jointly by the student and a faculty advisor. Guidelines are available from the School.

A minimum GPA of 2.0 is required to maintain Professional Program status. Grades lower than "C" in required Design courses will result in academic probation, suspension, or drop from the School of Design.

Full-time students are required to enroll for a minimum of 36 units per semester, with 45 units required for expected degree progress (typically five courses per semester). The minimum number of units required for graduation in Design is 360.

## Academic Standards

The design curriculum adheres closely to the fundamental professional entry-level standards established by the two leading national design organizations: the American Institute of Graphic Arts (AIGA) and the Industrial Designers Society of America (IDSA).

## Applications

The School of Design accepts applications from students who are completing secondary education or who wish to transfer from within Carnegie Mellon University. The School also accepts applications from students who wish to transfer from other institutions. Students applying for the program are asked to either 1) submit a portfolio or 2) complete a design project (available as a PDF on the Design web site) as evidence of design ability. This is considered in balance with evidence of academic ability, based on secondary school grades, SAT scores, class rank, and letters of recommendation. The School also accepts applications for the design minors program for a limited number of spaces. Details are available from the design office.

## Faculty

ERIC ANDERSON, Associate Professor of Design – M.A., Ohio State University; Carnegie Mellon, 1998–.

MARK BASKINGER, Associate Professor of Design – M.F.A., University of Illinois; Carnegie Mellon, 2003–.

DANIEL BOYARSKI, Professor of Design – M.F.A., Indiana University School for Design, Kunstgewerbeschule, Basel, Switzerland; Carnegie Mellon, 1982–.

CHARLEE MAE BRODSKY, Professor of Photography – M.F.A., Yale University; Carnegie Mellon, 1978–.

WAYNE CHUNG, Associate Professor of Design – MID, University of the Arts; Carnegie Mellon, 2007–.

JODI FORLIZZI, Professor, joint faculty in Design and Human Computer Interaction Institute – Ph.D., Carnegie Mellon University; Carnegie Mellon, 2000–.

BRUCE HANINGTON, Associate Professor of Design of Environmental and Industrial Design – Master of Environmental and Industrial Design, University of Calgary; Carnegie Mellon, 1998–.

KRISTIN HUGHES, Associate Professor of Design – M.F.A., Virginia Commonwealth University; Carnegie Mellon, 2001–.

AISLING KELLIHER, Associate Professor – M.S. & Ph.D, MIT; Carnegie Mellon, 2012–.

MARK MENTZER, Professor of Drawing – B.F.A., Carnegie Mellon University; Carnegie Mellon, 1975–.

THOMAS L. MERRIMAN, Teaching Professor in Design – B.F.A., Carnegie Mellon University; Carnegie Mellon, 1985–.

STACIE ROHRBACH, Associate Professor of Design – MGD, North Carolina State University; Carnegie Mellon, 2003–.

PETER SCUPELLI, Assistant Professor – MDes & Ph.D, Carnegie Mellon; Carnegie Mellon, 2011–.

STEPHEN J. STADELMEIER, Associate Professor of Design – M.S., Cornell University; Carnegie Mellon, 1977–.

CAMERON TONKINWISE, Associate Professor – Ph.D, University of Sydney; Carnegie Mellon, 2012–.

ANDREW TWIGG, Assistant Teaching Professor – B.A., Allegheny College; Carnegie Mellon, 2014–.

DYLAN VITONE, Associate Professor – M.F.A., Massachusetts College of Art; Carnegie Mellon, 2004–.

JOHN ZIMMERMAN, Associate Professor, joint faculty in Design and Human Computer Interaction Institute – MDes, Carnegie Mellon University; Carnegie Mellon, 2002–.

MATT ZYWICA, Assistant Teaching Professor – B.F.A., University of Illinois; Carnegie Mellon, 2014–.

## Courtesy Appointments

LUIS VON AHN, Assistant Professor of Computer Science – Ph.D, Carnegie Mellon University; Carnegie Mellon, 2005–.

JONATHAN CAGAN, George Tallman Ladd Professor of Mechanical Engineering – Ph.D., University of California Berkeley.; .

SUGURU ISHIZAKI, Associate Professor of Rhetoric and Visual Design – Ph.D., Massachusetts Institute of Technology; Carnegie Mellon, 2005–.

DAVID S. KAUFER, Professor of English and Rhetoric – Ph.D., University of Wisconsin; Carnegie Mellon, 1980–.

GOLAN LEVIN, Associate Professor of Art – M.S., Massachusetts Institute of Technology; Carnegie Mellon, 2004–.

## Special Faculty

JOSEPH M. BALLAY, IDSA, Professor of Design, Emeritus – M.F.A., Carnegie Mellon University; Carnegie Mellon, 1970-2002–.

ROBERT O. SWINEHART, Professor of Design, Emeritus – M.F.A., Northern Illinois University; Carnegie Mellon, 1974 - 2010–.