

INDUSTRIAL DESIGN (IND D)

Any experimental courses offered by IND D can be found at:

registrar.iastate.edu/faculty-staff/courses/explisting/ (<http://www.registrar.iastate.edu/faculty-staff/courses/explisting/>)

Courses primarily for undergraduates:

IND D 201: Industrial Design Studio I

(0-12) Cr. 6. F.

Prereq: Enrollment in IND D major

This is the first studio in the program introducing students to the industrial design process by focusing on the fundamentals of problem solving, critical thinking, basic market research and subsequent idea generation, emphasizing on sketching, experimentation, model making, visual and physical communication, and presentation.

IND D 202: Industrial Design Studio II

(0-12) Cr. 6. S.

Prereq: Enrollment in IND D major; IND D 201

Through a series of exercises, the second studio in the program advances students' skills in sketching, modeling and visual, physical and communication skills required for industrial design practice. Students will be implementing the use of new technologies in digital drawing, computer aided design (CAD) and analog and digital fabrication.

IND D 210: Fundamentals of Industrial Design

(3-0) Cr. 3.

Introduction to the discipline of Industrial Design: its definition, scope and basic principles of the profession as a whole. Overview of technical, artistic and social context of the profession.

IND D 220: Concepts of Sketching and Making I

(1-4) Cr. 3.

Introduction to basic tools and techniques used in different phases of the industrial design process. This course is the first in a series of two addressing key aspects of analog and digital communication tools and fundamentals of prototyping from different modes of sketching to physical sketch models.

IND D 240: Digital Tools For Industrial Design

(3-0) Cr. 3.

Introduction of digital applications and workflows through the lens specific to industrial design tasks and professional practices.

IND D 250: Activity-Centered Industrial Design

(3-0) Cr. 3.

Introduction to design for complex and dynamic situations that include people, products, activities and environments. Emphasizes the relationship between internal and external factors that impact pleasure and performance in these systems. Includes an overview of human diversity and examines the role of the industrial designer in developing the artifacts of daily activity.

IND D 260: Design engineering: From Thought to Thing

(3-0) Cr. 3.

What is making, building, constructing, engineering and technology and their roles for industrial design? Investigation of making techniques, engineering methods and technological advancements through case studies of everyday objects. Exploration of questions about the impact of materials choice and technologies of fabrication. Modeling, prototyping capabilities, and constructing a par with the engineering realm. Application of construction methods to industrial design in an inclusive "makers-lab" environment.

IND D 280: History of Industrial Design

(3-0) Cr. 3.

Introduction to contemporary and historic factors influencing industrial design craft and practice. Discussion of social, political, cultural and technological context for industrial design.

IND D 301: Industrial Design Studio III

(0-12) Cr. 6. F.

Prereq: Enrollment in IND D major; IND D 202

Exploration and application of systematic design methodology including sustainable practices and integration of creative thinking techniques through a sequence of progressive exercises.

IND D 302: Industrial Design Studio IV

(0-12) Cr. 6.

Prereq: (Enrollment in IND D major; IND D 301) OR Permission of Instructor

Exploration of commercial factors in industrial design. Meets Industrial Design Experiential Learning Requirements.

IND D 320: Design Research Methods

(3-0) Cr. 3.

Qualitative and quantitative methods with an emphasis on contextual user-centered research. Integration of user data collection, visualization, and synthesis as a source for design.

IND D 330: Creative Thinking in Design

(3-0) Cr. 3.

Exploration and practice of strategies, methods, facilitation, and processes associated with creative thinking skills and problem solving. Investigation of the nature of creativity and its implications in different contexts.

IND D 340: Digital Design Technologies

(0-6) Cr. 3.

Emphasis on computer-aided visualization techniques for 3D rendering and digital fabrication. Exploration and practice of several computer modeling applications as digitization tools for industrial design.

IND D 350: Applied Human Factors Lab

(0-1) Cr. 1.

Theory and application of human factors issues in the industrial design field, specifically their impact on the relationship of the user, the product, the product systems, and environment.

IND D 360: Materials and Processes for Industrial Design

(3-0) Cr. 3.

Introduction to materials and manufacturing methods for mass production and distribution of products including design for assembly and disassembly.

IND D 370: STEM literacy: How Things Work

(3-0) Cr. 3.

Dismantling mysteries surrounding science and technology. Identifying key concepts from applied science, engineering and technology to obtain better understanding on how things work. Review and explanation of the principles behind the technologies that define our modern way of life. Common everyday technology such as building electronic gadgets, interface hardware with computers, writing applications, systems applications and making functional electronics units, are some of the examples illustrating scientific knowledge and applications.

IND D 380: History and Culture of Objects

(3-0) Cr. 3.

Critical examination of meanings of objects from the perspectives of history, design, material culture, philosophy and cultural studies. Discussion of social, political, cultural and technological context for industrial design.

IND D 397: Industrial Design Internship

(0-12) Cr. 1-6. Repeatable, maximum of 12 credits.

Prereq: Enrollment in IND D major; IND D 202; 18 credits in IND D; Permission of Instructor

Professional industrial design, off-campus experience. Meets Industrial Design Experiential Learning Requirements.

IND D 401: Industrial Design Studio V: Commercial Practices

(0-12) Cr. 6. Repeatable, maximum of 18 credits.

Prereq: Enrollment in IND D major; IND D 301

Advanced topics focused on industrial design applications in commercial industries. Topics vary each time offered. Meets Industrial Design Experiential Learning Credits.

IND D 402: Industrial Design Studio: Design for Social Impact

(0-12) Cr. 6. F.S.SS.

Prereq: Enrollment in IND D major; IND D 301

Advanced topics focused on industrial design applications in service-learning and community engagement projects. Topics vary each time offered.

IND D 435: Strategic Design: Project Management

Cr. 3.

Review and development of executable strategies for entrepreneurial, commercial and business efforts. Focus on strategic thinking, economics of innovation, tactical approaches and effective measures in order to integrate a full cycle of product/service development. Advanced technical design processes, design management, decision-making and value proposition.

IND D 440: Portfolio and Professional Practice

(1-4) Cr. 3.

Prereq: Enrollment in IND D major; IND D 301

Discussion of industrial design practices, job market and career roadmap planning. Development and preparation of personal promotional materials for a range of media, including professional websites, personal brand, resumes, cover letters, business cards, print and/or digital portfolios.

IND D 460: Product Realization

(3-0) Cr. 3.

Prereq: Enrollment in IND D major; IND D 202

Advanced techniques of prototyping and model making for industrial design, using materials and manufacturing methods for product development. Exploration of the stages of design fabrication, systems-level implementation, testing, and constructing a par with the engineering realm. Use of typical prototyping materials, such as foam, wood, metal, plastic, plus new and emerging materials; CNC and 3D printing technologies will also be applied. Coupling the "makers-lab" movement with design entrepreneurship, development of advanced functional models and high-fidelity prototypes.

IND D 490: Special Topics

Cr. 1-6. Repeatable, maximum of 18 credits. F.S.SS.

Prereq: Permission of Instructor

Advanced topics focused on industrial design applications. Topics vary each time offered. A. Theory, Criticism, Methodology; B. Experimental Techniques; C. Three Dimensional Design; D. Distributed Collaboration.

IND D 490A: Special Topics: Theory, Criticism, Methodology

Cr. 1-6. Repeatable, maximum of 18 credits.

Prereq: Permission of Instructor

Advanced topics focused on theory, criticism, and methodologies in industrial design applications.

IND D 490B: Special Topics: Experimental Techniques

Cr. 1-6. Repeatable, maximum of 18 credits.

Prereq: Permission of Instructor

Advanced topics focused on industrial design applications. Topics vary each time offered.

IND D 490C: Special Topics: Three-Dimensional Design

Cr. 1-6. Repeatable, maximum of 18 credits.

Prereq: Permission of Instructor

Advanced topics focused on distributed collaboration in industrial design applications. Topics vary each time offered.

IND D 490D: Special Topics: Distributed Collaboration

Cr. 1-6. Repeatable, maximum of 18 credits.

Prereq: Permission of Instructor

Advanced topics focused on distributed collaboration in industrial design applications. Topics vary each time offered.

IND D 495: Study Abroad Option

Cr. 1-12. Repeatable, maximum of 12 credits. F.S.SS.

Prereq: Enrollment in IND D major; IND D 202; Permission of Instructor

Special topics in Industrial Design, design history, environmental design, historic and contemporary practice. Travel to relevant countries. General cultural and historical studies, topical projects, and individual inquiry. Courses may be taught by departmental faculty or faculty from approved Iowa State Study Abroad programs. See current offerings for detailed syllabus. Meetings industrial design experiential credit requirements.

IND D 499: Senior Project

(0-12) Cr. 6.

Prereq: Enrollment in IND D major; (IND D 401, IND D 397, or IND D 495);

Senior classification in IND D

Advanced practice in specialized area of industrial design. Topics vary.

Courses primarily for graduate students, open to qualified undergraduates:

IND D 501: Industrial Design Graduate Studio I

(0-12) Cr. 6.

Prereq: Senior or graduate standing

Fundamental concepts, design processes, and techniques for industrial design. Emphasis on project-based application of design models and procedures for form development, structure, function and communication.

IND D 502: Industrial Design Graduate Studio II

(0-12) Cr. 6.

Prereq: Graduate standing

Advanced project-based application of industrial design theories and techniques. Emphasis on service and systems design, and its implications for community and social innovation. Application of entrepreneurial factors and systematic design methodology of complex design problems and innovative solutions.

IND D 505: MinD Lab I

(1-4) Cr. 3. Repeatable, maximum of 2 times.

Workshop training sessions based on project-based themes of industrial design: weekly series of 'how-tos' and other practical demos regarding fundamentals, concepts and techniques of Design. Offerings vary with each term; check with department for available sections. Course contact hours can range from (2-0) to (3-0) depending on number of credits.

IND D 507: Industrial Design Practicum

(0-12) Cr. 6. Repeatable.

Prereq: Evidence of satisfactory experience in area of specialization; admitted by application and written permission of instructor only.

Studio project focused on topics generated with external partners. Topics vary. Meets Industrial Design Experiential Learning Requirements.

IND D 510: MinD Lab II

(1-4) Cr. 3. Repeatable, maximum of 2 times.

Advanced workshop training sessions on application of industrial design concepts and skills: emphasis on executive demos on design thinking, service and system design, and its implications for the community and industry outreach. Offerings vary with each term; check with department for available sections. Course contact hours can range from (2-0) to (3-0) depending on number of credits.

IND D 515: Graduate Colloquium

(1-0) Cr. 1. Repeatable.

Prereq: Graduate standing

Presentation and discussion of creative practices carried out in various design disciplines and their relationship to industrial design. Seminar sessions focusing on exemplary pieces of: design research undertaken by faculty; design education and learning pedagogies in design; and/or cross-disciplinary graduate work in design-related fields.

IND D 520: Design Theory Methodology

(3-0) Cr. 3.

Prereq: Senior or graduate standing.

Synthesis of methodological work in products of design. Theoretical framework that integrates in-depth concepts related to design activity, design science, research philosophies, cognitive models and cognitive biases, design processes from different fields, advanced creativity studies and problem reframing. User-centered research methods to examine the impact of design on humans, environments, and social contexts. Examination and critique of current research methods employed in industrial design, service design, design for interaction and user experience (UX) design.

IND D 530: Design Thinking

(3-0) Cr. 3.

Prereq: Senior or graduate standing in any ISU program

Exploration of design thinking process, toolkits, and mindsets as creative problem solving approaches for systems, products, and processes, across diverse contexts. Strategies for problem-framing, creative solutions and co-evolution process, with a focus on collaborative and interdisciplinary design to investigate real-world problems and opportunities.

IND D 540: Design Communication

(0-6) Cr. 3.

Emphasis on design narratives and story-telling. Exploration of creative digital media and multiple visual communication techniques which help break down complex information. Added professional development techniques such as positioning, intrapreneurship, design manifesto, design statement, client rapport, persuasive communication methods and speculative design will be applied.

IND D 550: Human Factors: User Experience Design

(3-0) Cr. 3.

Human factors issues and the study of relationships between the user, the product, and the human body and its physical functions. Advanced investigations of bio-mechanics, anthropometry, instrumental displays and control, and their measurement as they relate to the design process. Emphasis on experience design, user narratives, interactions and context mapping, mapping out issues of usability, design inclusivity, diversity and integrity.

IND D 560: Change by Design: Disruptive Innovation

(3-0) Cr. 3. F.

Exploration and execution of applied projects on civic entrepreneurship, social innovation and design activism. Through the 3 lenses of strategic, systems and critical thinking, it addresses the importance of design for social impact when applied to cases of service-learning, community-engagement, design ethics and transitional design. Change theory and management are central to examine diffusions and disruptions of innovation.

IND D 570: Systems Thinking in Design

(3-0) Cr. 3. F.

Emphasis on 21st Century Design Issues through systems thinking as language, problem-framing as pivoting process and transitional design as frame innovation model. Exploration of interconnected and dynamic 21st century global issues, where complexity and future industries play a key role. Issues such as societal transitions, loss of biodiversity and climate change, circular economy, eco-centric design, aging, equity, mobility, robotics, cybernetics, etc. are discussed and mapped out for industrial design applications.

IND D 580: Material Culture and Values

Cr. 3. S.

Examination of the meanings of objects from the perspectives of design, material culture, philosophy and cultural studies. Critically examine the role of objects in everyday life. Concepts include: value of things, semiotics, object fetishism, product semantics, consumer value and production labor. Case studies of historic and contemporary objects will be discussed to understand key theoretical concepts and to make meaningful connection between theory and everyday objects.

IND D 590: Special Topics

(1-12) Cr. 1-6. Repeatable, maximum of 18 credits. F.S.SS.

Prereq: Completion of industrial design studio or permission of instructor.

Advanced topics focused on industrial design applications. Topics include theory, criticism, methodology, experimental techniques, three dimensional design, distributed collaboration. Meets Industrial Design Experiential Learning Requirements.

IND D 592: Special Projects

Cr. arr. Repeatable. F.S.SS.

Prereq: Completion of industrial design studio or permission of instructor.

Planned projects in topics related to theory, criticism, methodology, experimental techniques, three dimensional design, distributed collaboration.

IND D 593: Experiential Learning Special Projects

Cr. arr. Repeatable. F.S.SS.

Prereq: Completion of industrial design studio or permission of instructor.

Project based topics related to theory, criticism, methodology, experimental learning, three dimensional design, distributed collaboration that supports experiential learning.

IND D 595: Study Abroad Option

(0-12) Cr. 6. Repeatable. F.S.SS.

Prereq: Completion of industrial design studio or permission of instructor.

International study abroad program. Visits to design studios, showrooms, museums and manufacturing facilities. Meets Industrial Design Experiential Learning Requirements.

IND D 597: Internship

(0-12) Cr. 1-6. Repeatable, maximum of 18 credits. F.S.SS.

Prereq: 12 studio credits in INDD; Permission of Instructor

Professional industrial design, off-campus experience. Meets Industrial Design Experiential Learning Requirements.

Courses for graduate students:**IND D 601: Industrial Design Graduate Studio III**

(0-12) Cr. 6.

Prereq: DSN S 501 or IND D 501

Advanced studio-based creative component in specialized area of focus within industrial design or cross-disciplinary field. Prepares for graduate design project, culminating in a development plan, project initiation document and supporting documented inquiry.

IND D 602: MInD Graduate Project

(0-12) Cr. 6.

Prereq: IND D 601

Graduate project's creative component in specialized area of focus within industrial design or cross-disciplinary field. Culminates in a physical or digital artifact and supporting documentation such as graduate defense presentation and design process book.

IND D 630: Critical Reflections for Thesis Preparation

(3-0) Cr. 3. S.

Prereq: Graduate standing

Through the lenses of STEM literacy and critical thinking, exploration of why philosophy of science, technological and engineering literacies are connected to social justice and are related areas. Reflections on the effects of design projects on human health, social structures, and the environment, and examination of improvements in economic growth and quality of life. Case studies on the effects of Design and STEM to prepare for the formulation of graduate thesis or project topics, with proposed plan of investigations.

IND D 640: Advanced Digital Technologies

(1-4) Cr. 3.

Exploration of interactive technologies and digital thinking industries. Advanced concepts in computer to machine interface for manufacture, digital materiality, conversational interfaces, gamification, congruence, mixed reality AR/VR, and critical media for future industries.

IND D 699: MInD Graduate Thesis

(0-12) Cr. 6. Repeatable.

Prereq: IND D 632

Advanced research component in specialized area of focus within industrial design. Culminates in a thesis document.