

STRANDS AND STANDARDS

INDUSTRIAL DESIGN



Course Description

This instructional course prepares individuals to apply technical knowledge and skills to develop and create concepts that optimize the function, value, and appearance of products for the benefit of both user and manufacturer (IDSA).

Intended Grade Level	11-12
Units of Credit	0.5
Core Code	40.13.00.00.030
Concurrent Enrollment Core Code	N/A
Prerequisite	Design and Visual Communication/ Commercial and Advertising Art
Skill Certification Test Number	534
Test Weight	1.0
License Type	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Commercial Art
Endorsement 2	N/A
Endorsement 3	N/A



STRAND 1

Students will be able to demonstrate knowledge of the industrial design profession.

Standard 1

Demonstrate knowledge of the industrial design profession, job standards, professional development, and explore higher education and career opportunities.

Standard 2

Understand the relationship of industrial design to other design and related professions.

Standard 3

Explore careers and opportunities in industrial design.

- Salary/hours/working conditions
- Work expectations
- Freelance conditions
- Post-secondary education

Performance Skill

Demonstrate knowledge of the industrial design profession.

- Demonstrate knowledge of the industrial design profession, job standards, professional development, and explore higher education and career opportunities.
- Understand the relationship of industrial design to other design and related professions.
- Explore careers and opportunities in industrial design.

STRAND 2

Students will understand and be able to apply the design process to products and systems.

Standard 1

Understand principles of design research in relation to problem finding and problem solving.

- Observation
- Experience
- Inquiry
- Data synthesis
- Target audience

Standard 2

Understand and be able to apply principles for ideation and divergent thinking (brainstorming).

- Explore ideas
- Question
- Make connections
- Validate an idea
- Develop the concept based upon validation

Standard 3

Understand and use the workflow process.

- Research
- Thumbnails
- Sketches
- Full color rendering
- Digital rendering
- Mock-up
- Model

Performance Skill

Understand and be able to apply the design process to products and systems.

- Understand principles of design research in relation to problem finding and problem solving.
- Understand and be able to apply principles for ideation and divergent thinking (brainstorming).
- Understand and use the workflow process.

STRAND 3

Students will be able to demonstrate knowledge of design elements and principles in solving simple industrial design problems.

Standard 1

Render an idea utilizing the elements of design.

- Lines in space (chaos in order)
- Surface
- Form/volume
- Structure
- Value
- Color (color themes, theory, and wheel)
- Texture

Standard 2

Demonstrate an ability to utilize principles of 3D design in form development.

- Balance (visual)
- Unity/variety
- Contrast
- Emphasis
- Direction and movement
- Repetition
- Proportion

Standard 3

Interpret and critique artistic use of design elements and principles in product design.

- Form vs. function
- Physical balance

Performance Skill

Demonstrate knowledge of design elements and principles in solving simple industrial design problems.

- Render an idea utilizing the elements of design.
- Demonstrate an ability to utilize principles of 3D design in form development.
- Interpret and critique artistic use of design elements and principles in product design.

STRAND 4

Students will be able to demonstrate knowledge of human factors related to design.

Standard 1

Understand how human anatomy, physiology, and psychology apply to product development.

Standard 2

Demonstrate the application of human factors in product design.

- Ergonomics
- Aesthetics
- Haptic

Standard 3

Demonstrate knowledge of the impact of design and technology has on the individual, society, and the environment.

- Social sustainability
- Environmental sustainability
- Cultural sustainability

Performance Skill

Demonstrate knowledge of human factors related to design.

- Understand how human anatomy, physiology, and psychology apply to product development.
- Demonstrate the application of human factors in product design.
- Demonstrate knowledge of the impact of design and technology has on the individual, society, and the environment.

STRAND 5

Students will be able to conceive and create a product.

Standard 1

Conceive and develop a mockup of the product.

- Quick 3D rough draft

Standard 2

Build a model of the product.

- Refined 3D example

Performance Skill

Conceive and create a product.

- Conceive and develop a mockup of the product.
- Build a model of the product.

STRAND 6

Students will understand and demonstrate the ability to present ideas.

Standard 1

Use multiple techniques, tools, and processes to develop compelling 2D and 3D product concept presentations and articulating the process used in their form development.

- Constraining proportions
- Cropping

Standard 2

Understand the importance of working individually or as a team in developing effective presentations.

- Visual presentation of the product (PowerPoint, presentation board, 3D model)
- Student presence (posture, communication, body language, dress)
- Presentation of idea, sell the product's functionality, aesthetics, and sustainability

Performance Skill

Understand and demonstrate the ability to present ideas.

- Use multiple techniques, tools, and processes to develop compelling 2D and 3D product concept presentations and articulating the process used in their form development.
- Understand the importance of working individually or as a team in developing effective presentations.

STRAND 7

Students will demonstrate knowledge and use of computer technology.

Standard 1

Demonstrate knowledge of basic computer vocabulary and techniques.

- Tools and shortcuts
- Color modes
- Vector vs raster qualities and advantages
- Adobe software terminology, i.e. guides, strokes

Standard 2

Understand file types and use them appropriately.

- Print applications: TIFF, JPG, etc.
- Web applications: PNG, WMG, etc.
- File transfer: IGES, STL, PDF, etc.
- Resolution and how it's used

Standard 3

Use appropriate software for design communication and implementation for job/project completion.

- Adobe Illustrator
- Adobe Photoshop
- Others (Autodesk software, CAD, etc.)

Standard 4

Use appropriate software for design communication and implementation for job/project completion.

- CMYK
- RGB

Performance Skill

Demonstrate a knowledge and use of computer technology.

- Demonstrate knowledge of basic computer vocabulary and techniques.
- Understand file types and use them appropriately.
- Use appropriate software for design communication and implementation for job/project completion.
- Know the appropriate color mode in computer applications.

STRAND 8

Students will understand basic ethical and legal issues involved in design.

Standard 1

Define ways to protect your ideas.

Standard 2

Discuss types of patents and their merits.

Standard 3

Practice ethics and rules governing industrial design.

STRAND 9

Students will be able to demonstrate safe practices.

Standard 1

Know and apply basic safety rules for working with tools, machines, and material.

Standard 2

Know and apply the basics for keeping machines and tools in good working order.

Standard 3

Know and apply basic safety procedures when working with computers and electronic devices and understand the archiving process for digital files.

Standard 4

Clean and maintain an orderly work area.

Performance Skill

Demonstrate safe practices.

- Know and apply basic safety rules for working with tools, machines, and material.
- Know and apply the basics for keeping machines and tools in good working order.
- Know and apply basic safety procedures when working with computers and electronic devices and understand the archiving process for digital files.
- Clean and maintain an orderly work area.

STRAND 10

Students will understand the importance of career readiness skills as it relates to the workplace and outlined in the SkillsUSA Framework – Level 2.

Standard 1

Understand and demonstrate reliability.

- Determine individual time management skills.
- Explore what's ethical in the workplace or school.
- Demonstrate awareness of government.
- Demonstrate awareness of professional organizations and trade unions.

Standard 2

Understand and demonstrate responsiveness.

- Define the customer.
- Recognize benefits of doing a community service project.

- Demonstrate social etiquette.
- Identify customer expectations.

Standard 3

Understand resiliency.

- Discover self-motivation techniques and establish short-term goals.
- Select characters of a positive image.
- Identify a mentor.

Standard 4

Understand and demonstrate workplace habits.

- Participate in a shadowing activity.
- Explore workplace ethics: codes of conduct.
- Recognize safety issues.
- Perform a skill demonstration.
- Exercise your right to know.

Standard 5

Understand and develop initiative.

- Develop personal financial skills.
- Develop a business plan.
- Investigate entrepreneurship opportunities.

Standard 6

Understand and demonstrate continuous improvement.

- Conduct a worker interview.
- Demonstrate evaluation skills.
- Examine ethics and values in the workplace.
- Develop a working relationship with a mentor.
- Construct a job search network.

STRAND 8

Students will understand the importance of career readiness skills as it relates to the workplace and outlined in the SkillsUSA Framework – Level 3.

Standard 1

Understand and develop collaboration skills.

- Develop a working relationship with a mentor.
- Apply supervisory skills.
- Manage a project and evaluate others.

Standard 2

Understand and demonstrate change management skills.

- Evaluate your career and training goals.

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- Identify and apply conflict resolution skills.
- Illustrate an organizational structure.
- Plan and implement a leadership project.

Standard 3

Understand how customer service applies to the workplace.

- Serve as a volunteer in the community.
- Examine workplace ethics: the role of values in making decisions.
- Understand the cost of customer service.
- Develop customer service skills.
- Maximize customer service skills.

Standard 4

Understand and demonstrate career readiness.

- Market your career choice.
- Research resume writing.
- Demonstrate interviewing skills.
- Predict employment trends.
- Re-evaluate career goals and establish long-term goals.
- Construct a job search network.
- Evaluate professional competencies.
- Analyze your entry-level job skills.
- Design and present a lesson plan on an aspect of your career choice.
- Write an article for a professional journal in your career area.
- Refine your employment portfolio.

Skill Certificate Test Points by Strand

Test Name	Test #	Number of Test Points by Strand										Total Points	Total Questions
		1	2	3	4	5	6	7	8	9	10		
Industrial Design	534	3	6	15	5	2	6	13	4	1	1	56	39