

Design Drafting Supplemental Program Resources



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Introduction

This document provides supplemental information for the Design Drafting program of study. It may be updated or revised as the base program of study, or complementary programs, are updated, added, or removed. Please contact the appropriate Education Programs Professional with any questions.

The Program of Study includes the approved courses, complementary courses, alignment(s) to industry, postsecondary options, and additional information.

The Equipment List for the Design Drafting program of study is included and, if applicable, additional items used only in the complementary course(s) are noted.

The Crosswalks and Alignments connect and support the Design Drafting standards for the Architecture and Construction program of study. Complementary course standards are not listed in the crosswalks and alignments.

Program of Study Information

The following program of study information sheet as well as the program structure tables for the courses are provided to be able to print separately for handouts. The information provided is based on the best available information at the time of this document and will be updated as appropriate.

Design Drafting



The Design Drafting program provides students with the principles of technical drafting and design concepts. Areas of study include sketching, dimensioning and annotation, construction and engineering documentation, 3D modeling, problem solving, critiquing, and team building.

Architecture and Construction Career Cluster

Architecture and Construction is focused on careers in designing, planning, managing, building, and maintaining the built environment.

Postsecondary Options

Secondary

- Certificate of Skills Attainment

Associates Degree

- Technology- Construction, AAS (WNC)
- Construction and Design, Architecture, AAS (TMCC)
- Manufacturing Technologies, Drafting, AAS (TMCC)
- Construction and Design, Landscape Architecture, AAS (TMCC)
- Construction and Design, Residential Design (AAS)

Bachelor's Degree

- Architecture, BS (UNLV)
- Interior Architecture and Design, BS (UNLV)
- Bachelor of Landscape Architecture (UNLV)

Master's/Doctoral Degree

- Master of Architecture (UNLV)



For additional information on this cluster, please contact:

Jennifer Kazarian at jennifer.kazarian@doe.nv.gov

Website: <https://doe.nv.gov/CTE/>

Approved Courses

- Design Drafting I
- Design Drafting II
- Design Drafting II Lab

Complementary Courses

- Design Drafting Advanced Studies
- Architecture Design
- CTE Work Experience – Architecture and Construction
- IRC – Design Drafting

Work-Based Learning Opportunities

- Job Shadowing / Internship / Work Experience / Career Days / Career Fairs / Field Trips / Guest Speakers

Career and Technical Student Organization

SkillsUSA



State Recognized Industry Certifications

Refer to the Governor's Office of Innovation's [Nevada Eligible Industry Credentialing List](#)

Aligned to Industry			
Occupation	Median Wage Per year	Annual Openings	% Growth
Architectural and Engineering Managers	\$152,350	14,000	2.0%
Landscape Architects	\$67,950	1,500	0.0%
Drafters	\$60,290	18,900	-3.0%
Surveying and Mapping Technicians	\$61,600	7,800	4.0%
Surveyors	\$82,380	3,800	1.0%
Architects	\$80,180	9,100	3.0%

Source U.S. Bureau of Labor Statistics 2022

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Program Structure for Design Drafting

The core course sequencing is provided in the following table. Complementary Courses are available and provided later in this document. The following courses provides a completed program of study. The Lab is a complementary course available concurrently with the Design Drafting II course.

Core Course Sequence (R) with Lab Course(s) (C)

Required/ Complementary	Course Title	Abbreviated Name	CIP Code	SCED Subject Area	SCED Course Identifier	SCED Course Level	SCED Unit Credit	SCED Course Sequence	SCED Course Number
R	Design Drafting I	DES DRAFT I	15.1302	21	102	G	1.00	12	21102G1.0012
R	Design Drafting II	DES DRAFT II	15.1302	21	102	G	1.00	22	21102G1.0022
C	Design Drafting II LAB	DES DRAFT II L	15.1302	21	102	E	1.00	22	21102E1.0022

The complementary courses are provided in the following table. **The qualifying program of study must be completed prior to enrolling in the complementary course(s).** A program does not have to utilize the complementary courses for students to complete their program of study.

Required/ Complementary	Course Title	Abbreviated Name	CIP Code	SCED Subject Area	SCED Course Identifier	SCED Course Level	SCED Unit Credit	SCED Course Sequence	SCED Course Number
C	Architecture Design	ARCH DESG	15.1303	21	103	E	1.00	11	21103E1.0011
C	Design Drafting Advanced Studies	DES DRAFT AS	15.1302	21	102	E	1.00	11	21102E1.0011
C	Industry Recognized Credential - Design Drafting	IRC DES DRAFT	15.1302	17	999	E	1.00	11	17999E1.0011
C	CTE Work Experience - Architecture and Construction	WORK EXPER CONST	99.0002	17	998	G	1.00	11	17998G1.0011

CIP Code – Classification of Instructional Programs (CIP) Codes

SCED – School Courses for the Exchange of Data that populates the State Infinite Campus System and the System for Accountability Information in Nevada (SAIN)

Course Descriptions

Design Drafting I

Prerequisite: None

This course introduces the student to the fundamentals of sketching and computer-aided drafting and design (CADD). This course provides students with the knowledge and practice in sketching techniques, and CADD required to produce and analyze multi-view drawings, pictorial drawings, and dimensioning. Various career opportunities and areas for postsecondary study will be explored.

Design Drafting II

Prerequisite: Design Drafting I

This course is a continuation of Design Drafting I. This course provides CADD students with techniques and processes related to the various drafting and design industries. Areas of study include the development of advanced CADD and sketching skills, plotting, scaling, three dimensional models, problem solving, critiquing, and team building. The appropriate use of technology and industry-standard equipment is an integral part of this course.

Design Drafting II LAB

Prerequisite: Concurrent enrollment in Design Drafting II

This course is designed to expand the students' opportunities for applied learning. This course provides an in-depth lab experience that applies the processes, concepts, and principles as described in the classroom instruction. The coursework will encourage students to explore and develop advanced skills in their program area. The appropriate use of technology and industry-standard equipment is an integral part of this course.

Design Drafting Advanced Studies

Prerequisite: Completion of Design Drafting Program of Study

This course is offered to students who have completed all content standards in a program and desire to pursue advanced study through investigation and in-depth research. Students are expected to work independently or in a team and consult with their supervising teacher for guidance. The supervising teacher will give directions, monitor, and evaluate the students' topic of study. Coursework may include various work-based learning experiences such as internships and job shadowing, involvement in a school-based enterprise, completion of a capstone project, and/or portfolio development. This course may be repeated for additional instruction and credit.

Architecture Design

Prerequisite: Completion of Design Drafting Program of Study

This course is offered to students who have completed all content standards in the Design Drafting program of study. This course provides students with instruction in advanced techniques and processes. Students will apply the skills learned in Design Drafting I and II to complete architectural design tasks and professional portfolios. Areas of emphasis will include building codes, building materials, green building techniques, and professional presentation skills. Students will complete project-based activities to compare residential and commercial architectural methodologies. The appropriate use of technology and industry-standard equipment is an integral part of this course. Upon successful completion of this course, students will have acquired entry-level skills for employment and be prepared for postsecondary education.

Industry-Recognized Credential – Design Drafting

Prerequisite: Completion of Design Drafting Program of Study

This course is offered to students who have completed all content standards in a program of study and desire to pursue an Industry-Recognized Credential that aligns with the standards and skills associated with the Design Drafting Program of Study. This course is designed to expand the students' opportunities to pursue certification aligned with employment standards in the industry aligned with this program of study. The supervising teacher will provide instruction aligned with the certification requirements, monitor progress toward certification, and provide the students with appropriate testing or certification opportunities associated with the intended Industry-Recognized Credential that is the subject of the course. This course may be repeated for additional instruction and credit.

CTE Work Experience – Architecture and Construction

Prerequisite: Completion of Level 2 course in the qualifying program of study

This course is designed to expand the students' opportunities for applied learning. This course provides an in-depth CTE work experience that applies the processes, concepts, and principles as described in the classroom instruction. This course will encourage students to explore and develop advanced skills through work-based learning directly related to the program of study. The course must follow NAC 389.562, 389.564, 389.566 regulations.

Equipment List

This recommended list is based upon a classroom size of 25 students. All costs are estimated and may be adjusted once verified and justified by districts with current quotes. No specific equipment vendor or brand names are endorsed due to various possibilities, but school districts should consult with stakeholders to ensure industry-recognized equipment and software are purchased. The intent of this list is to provide school districts with guidance on the equipment needed to implement the state standards for a Design Drafting program.

CTE Classroom Equipment

Total: \$17,210

QTY	ITEM DESCRIPTION	UNIT	TOTAL
25	Student Workstations w/chairs	\$400	\$10,000
1	Teacher Workstation w/chair	\$400	\$400
1	Teacher Computer (enhanced memory/storage, download capable)	\$1,400	\$1,400
1	Presentation Equipment (e.g., interactive whiteboard (IWB), or other interactive display system with software and accessories)	\$3,000	\$3,000
1	Networkable Laser Printer (black/white or color)	\$400	\$400
1	Vertical File Cabinet (lockable)	\$330	\$330
2	Storage Cabinets (36" x 12" x 72") (lockable)	\$300	\$600
2	Bookcases (36" x 12" x 42")	\$115	\$230
2	White Boards (4' x 8')	\$110	\$220
1	Eyewash Station	\$300	\$300
1	Fire Extinguisher	\$130	\$130
1	Sink with Soap Dispenser	\$100	\$100
1	First Aid Kit	\$100	\$100

Program Equipment

Total: \$42,800

QTY	ITEM DESCRIPTION	UNIT	TOTAL
25	Student Computers	\$1,000	\$25,000
1	Technology Storage/Charging System	\$2,000	\$2,000
2	Networkable Large Format Color Plotters	\$4,000	\$8,000
2	Large scale drawing file cabinets (30" x 42")	\$900	\$1,800
Varies	3D Printer and Supplies	\$6,000	\$6,000

Supplemental Program Resources

2023

Instructional Materials

Total:

\$9,000

QTY	ITEM DESCRIPTION	UNIT	TOTAL
25	Student Textbooks (Approved by NDE) CTE Instructional Materials list can be found here .	\$100	\$2,500
1	Teacher Textbook Edition and Resources	\$500	\$500
1	3D Modeling Computer-aided Design (CAD) Software with Site License	\$5,000	\$5,000
Varies	Architectural Graphic Standards, Mechanical Graphic Standards (material books and other resources and/or guides)	\$1,000	\$1,000

Instructional Supplies

Total:

\$5,550

QTY	ITEM DESCRIPTION	UNIT	TOTAL
Varies	Sketching Tools (drawing boards, triangles, drafting mechanical pencils, brushes, scales [architectural, metric, and engineering], T-squares, etc.)	\$2,500	\$2,500
Varies	Model Supplies (balsa wood, clay, pins, paint, and other modeling materials)	\$1,000	\$1,000
Varies	Supplies (various types of paper, sketching pencils and paints, lead, erasers, etc.)	\$1,000	\$1,000
Varies	Model Tools (various cutting tools, utility knives, pin setters, etc.)	\$750	\$750
Varies	Personal Protective Equipment (PPE) (gloves, glasses/goggles, etc.)	\$300	\$300

Other

Total:

\$300

QTY	ITEM DESCRIPTION	UNIT	TOTAL
1	Occupational Safety and Health Administration (OSHA) Instructor Training	\$300	\$300

Category Totals:

Classroom Equipment	\$17,210
Program Equipment	\$42,800
Instructional Materials	\$9,000
Instructional Supplies	\$5,550
Other	\$300
Estimated Program Total	\$74,860

Crosswalks and Alignments for Program of Study Standards

Crosswalks and alignments are intended to assist the teacher make connections for students between the technical skills within the program and academic standards. The crosswalks and alignments are not intended to teach the academic standards but to assist students in making meaningful connections between their CTE program of study and academic courses. The crosswalks are for the required program of study courses, not the complementary courses.

Crosswalks (Academic Standards)

The crosswalks of the Design Drafting Standards show connections with the Nevada Academic Content Standards. The crosswalk identifies the performance indicators in which the learning objectives in the Design Drafting program connect with and support academic learning. The performance indicators are grouped according to their content standard and are crosswalked to the Nevada Academic Content Standards in English Language Arts, Mathematics, and Science.

Alignments (Mathematical Practices)

In addition to connections with the Nevada Academic Content Standards for Mathematics, many performance indicators support the Mathematical Practices. The following table illustrates the alignment of the Design Drafting Standards Performance Indicators and the Mathematical Practices. This alignment identifies the performance indicators in which the learning objectives in the Design Drafting program connect with and support academic learning.

Alignments (Science and Engineering Practices)

In addition to connections with the Nevada Academic Content Standards for Science, many performance indicators support the Science and Engineering Practices. The following table illustrates the alignment of the Design Drafting Standards Performance Indicators and the Science and Engineering Practices. This alignment identifies the performance indicators in which the learning objectives in the Design Drafting program connect with and support academic learning.

Crosswalks (Common Career Technical Core)

The crosswalks of the Design Drafting Standards show connections with the Common Career Technical Core. The crosswalk identifies the performance indicators in which the learning objectives in the Design Drafting program connect with and support the Common Career Technical Core. The Common Career Technical Core defines what students should know and be able to do after completing instruction in a program of study. The Design Drafting Standards are crosswalked to the Architecture and Construction Career Cluster™ and the Design/Pre-Construction Career Pathway.

Crosswalk of Design Drafting Program of Study Standards and the Nevada Academic Content Standards (possibly more than one)

English Language Arts: Language Standards

Nevada Academic Content Standards	Performance Indicators
L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	1.5.2

English Language Arts: Reading Standards for Literacy in Science and Technical Subjects

Nevada Academic Content Standards	Performance Indicators
RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.	3.1.9
RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	2.3.4
RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.	2.1.1, 2.3.4, 2.3.6, 2.5.2 2.5.4; 3.5.5; 4.1.1, 4.2.1
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.	3.1.7, 3.4.5
RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	2.2.1, 2.5.3

English Language Arts: Speaking and Listening Standards

Nevada Academic Content Standards	Performance Indicators
SL.11-12.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.	1.1.1, 1.1.2, 1.2.1, 1.2.4 1.4.2, 1.5.2; 2.2.1
SL.11-12.2 Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.	1.1.1, 1.1.2, 1.2.1, 1.2.4 1.4.2
SL.11-12.3 Evaluate a speaker’s point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.	3.3.1
SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.	1.1.1, 1.1.2, 1.2.1, 1.2.4 1.4.2, 1.5.2

English Language Arts: Writing Standards for Literacy in Science and Technical Subjects

Nevada Academic Content Standards		Performance Indicators
WHST.11-12.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	1.2.5, 1.4.1, 1.4.4; 2.1.1 2.3.6, 2.3.7; 3.5.1; 4.1.1 4.2.1
WHST.11-12.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	1.4.4
WHST.11-12.6	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	1.4.5
WHST.11-12.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	1.1.2, 1.1.3, 1.4.2, 1.4.3 1.5.2
WHST.11-12.9	Draw evidence from informational texts to support analysis, reflection, and research.	2.2.1

Math: Algebra – Creating Equations

Nevada Academic Content Standards		Performance Indicators
ACED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	3.3.1

Math: Functions – Building Functions

Nevada Academic Content Standards		Performance Indicators
FBF.A.1b	Combine standard function types using arithmetic operations.	2.2.6, 2.2.7

Math: Geometry – Circles

Nevada Academic Content Standards		Performance Indicators
GC.A.4	(+) Construct a tangent line from a point outside a given circle to the circle.	2.1.2, 2.1.5

Math: Geometry – Congruence

Nevada Academic Content Standards		Performance Indicators
GCO.A.5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	4.2.3, 4.2.4
GCO.B.6	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	4.2.4
GCO.D.12	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	2.1.2, 2.1.3, 2.1.4, 2.1.5
GCO.D.13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	2.1.2

Math: Geometry – Geometric Measurement and Dimension

Nevada Academic Content Standards		Performance Indicators
GGMD.B.4	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	2.4.3; 4.2.4

Math: Geometry – Expressing Geometric Properties with Equations

Nevada Academic Content Standards		Performance Indicators
GGPE.B.7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	3.3.2

Math: Geometry – Modeling with Geometry

Nevada Academic Content Standards		Performance Indicators
GMG.A.1	Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).	4.2.2

Math: Geometry – Similarity, Right Triangles, and Trigonometry

Nevada Academic Content Standards		Performance Indicators
GSRT.A.1	Verify experimentally the properties of dilations given by a center and a scale factor:	2.2.1

Math: Number & Quantity – Quantities

Nevada Academic Content Standards		Performance Indicators
NQ.A.2	Define appropriate quantities for the purpose of descriptive modeling.	2.4.4; 3.2.3
NQ.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	2.4.4, 2.5.4; 3.2.7

Alignment of Design Drafting Standards and the Mathematical Practices

Mathematical Practices	Design Drafting Performance Indicators
1. Make sense of problems and persevere in solving them.	4.2.2
2. Reason abstractly and quantitatively.	2.2.1
3. Construct viable arguments and critique the reasoning of others.	
4. Model with mathematics.	2.1.2, 2.1.3, 3.2.3, 3.3.1 4.2.3, 4.2.4
5. Use appropriate tools strategically.	2.1.4, 2.1.5, 3.2.7
6. Attend to precision.	2.2.3, 2.4.4 2.5.4, 3.3.2
7. Look for and make use of structure.	
8. Look for and express regularity in repeated reasoning.	2.1.6, 2.2.7

Alignment of Design Drafting Standards and the Science and Engineering Practices

Science and Engineering Practices	Design Drafting Performance Indicators
1. Asking questions (for science) and defining problems (for engineering).	
2. Developing and using models.	4.2.2-4.2.4
3. Planning and carrying out investigations.	
4. Analyzing and interpreting data.	2.5.4
5. Using mathematics and computational thinking.	2.1.6, 2.2.2, 2.2.3, 2.2.6, 2.2.7 3.3.1, 3.3.2
6. Constructing explanations (for science) and designing solutions (for engineering).	4.2.7
7. Engaging in argument from evidence.	
8. Obtaining, evaluating, and communicating information.	

Crosswalks of Design Drafting Standards and the Common Career Technical Core

Architecture and Construction Career Cluster	Performance Indicators
1. Use vocabulary, symbols and formulas common to architecture and construction.	2.1.1, 2.3.4, 2.3.8
2. Use architecture and construction skills to create and manage a project.	2.2.4, 2.3.6, 2.7.7, 3.6.4
3. Comply with regulations and applicable codes to establish and manage a legal and safe workplace.	
4. Evaluate the nature and scope of the Architecture and Construction Career Cluster™ and the role of architecture and construction in society and the economy.	
5. Describe the roles, responsibilities and relationships found in the architecture and construction trades and professions, including labor/management relationships.	
6. Read, interpret and use technical drawings, documents and specifications to plan a project.	2.5.1
7. Describe career opportunities and means to achieve those opportunities in each of the Architecture and Construction Career Pathways.	1.4.3

Design/Pre-Construction Career Pathway	Performance Indicators
1. Justify design solutions through the use of research documentation and analysis of data.	
2. Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.	2.7.1, 2.7.3, 2.7.5, 2.7.7
3. Describe the requirements of the integral systems that impact the design of buildings.	
4. Apply building codes, laws, and rules in the project design.	
5. Identify the diversity of needs, values, and social patterns in project design, including accessibility standards.	
6. Apply the techniques and skills of modern drafting, design, engineering, and construction to projects.	3.4.3, 3.5.5, 4.1.3, 4.1.4 4.2.7
7. Employ appropriate representational media to communicate concepts and project design.	
8. Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components, and assemblies in the project design.	