

**Suggested Priority Cluster Area: Emerging Technologies
NM Job Council's 13 Economic Sectors Primary Alignment: Emerging
Technologies (non-governmental) and Extractives**

CAREER CLUSTER™: Architecture and Construction

Pathways and related Programs of Study in this career cluster address careers in designing, planning, managing, building and maintaining the built environment.

Program Learning Outcomes from the NASDCTE Common Career Technical Core:	
1.	Use vocabulary, symbols and formulas common to architecture and construction.
2.	Use architecture and construction skills to create and manage a project.
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.
7.	Describe career opportunities and means to achieve those opportunities in each of the Architecture and Construction Career Pathways.

Workforce Certification:	

The Pathways for this Career Cluster™ are:

- Construction
- Design/Pre-Construction
- Maintenance/Operations

Below are the POS's developed by the statewide stakeholders who participated in the development process.

Construction: Employees in construction literally build our future! These are the people who build and remodel houses, apartments, industrial buildings, warehouses, office buildings, churches, schools and recreational facilities. This pathway also includes the builders of highways, streets, bridges, tunnels and airports as well as power plants, chemical plants, refineries and mills.

Program Learning Outcomes from the NASDCTE Common Career Technical Core:	
1.	Describe contractual relationships between all parties involved in the building process.
2.	Describe the approval procedures required for successful completion of a construction project.
3.	Implement testing and inspection procedures to ensure successful completion of a construction project.
4.	Apply scheduling practices to ensure the successful completion of a construction project.
5.	Apply practices and procedures required to maintain jobsite safety.
6.	Manage relationships with internal and external parties to successfully complete construction projects.
7.	Compare and contrast the building systems and components required for a construction project.
8.	Demonstrate the construction crafts required for each phase of a construction project.
9.	Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.

POS Course Sequence: Created by Focus Group in 2014				
	9 th Grade	10 th Grade	11 th Grade	12 th Grade
Career and Technical Courses and/or Degree Major Courses as Dual Credit	0402: Intro to Construction OR 0414: Carpentry I	0425: Carpentry II	0426: Carpentry III	0498: Construction Trades Internship
Core Requirement 2			Construction Technology Elective	Construction Technology Elective

Program Learning Outcomes Matrix:										
Courses in the POS		Program Learning Outcomes								
STARS No.	Course Title	1	2	3	4	5	6	7	8	9
0402	Introduction to Construction									
0414	Construction Trades Internship									
0425	Carpentry I									
0426	Carpentry II									
0498	Carpentry III									

STARS No.	Course Descriptions:
0402	<p>Introduction to Construction</p> <ul style="list-style-type: none"> • Recommended for Students in Grade 9 • Course provides basic knowledge and skills required for construction of commercial, residential and institutional structures. These courses provide experiences and information (typically including career opportunities and training requirements) regarding construction related occupations such as carpentry, cabinetmaking, bricklaying, electrical trades, plumbing, concrete masonry and so on. Students engage in activities such as reading blueprints, preparing building sites, starting foundations, erecting structures, installing utilities, finishing surfaces and providing maintenance. Advanced courses may include study of transportation systems and infrastructures.
0414	<p>Carpentry I</p> <ul style="list-style-type: none"> • Recommended for Students in Grade 9 • Course provides information related to the building of wooden structures, enabling students to gain an understanding of wood grades and construction methods, and to learn skills such as laying sills and joists; erecting sills and rafters; applying sheathing, siding and shingles; setting door jams; and hanging doors. Carpentry courses may teach skills for rough construction, finish work, or both. Students learn to read blueprints, draft, use tools and machines properly and safely, erect buildings from construction lumber, perform finish work inside of buildings, and do limited cabinet work. Carpentry courses may also include career exploration, good work habits and employability skills.
0425	<p>Carpentry II</p> <ul style="list-style-type: none"> • Recommended for Students in Grades 9-12 • This is a second sequential course in a carpentry program of study meant to take a student into a higher level of knowledge and skill development.
0426	<p>Carpentry III</p> <ul style="list-style-type: none"> • Recommended for Students in Grades 9-12 • This is a third sequential course in a carpentry program of study meant to take a student into a higher level of knowledge and skill development.

STARS No.	Course Descriptions:
0498	<p>Construction Trades Internship</p> <ul style="list-style-type: none">• Recommended for Students in Grades 11-12• This course provides work experience in the construction or a related field, and is supported by classroom attendance and discussion. Goals are set for the employment period; classroom experience may involve further study of the field, improvement of employability skills, or discussion regarding the experiences and problems encountered on the job.

Design/Pre-Construction: People with careers in design/pre-construction create our future! They turn a concept into a set of plans. Their plans guide other construction professionals as they continue the building process.

Program Learning Outcomes from the NASDCTE Common Career Technical Core:	
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.
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.
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.

POS Course Sequence: Drafting Technologies				
	9 th Grade	10 th Grade	11 th Grade	12 th Grade
Career and Technical Courses and/or Degree Major Courses as Dual Credit	0702: Drafting-General	General Drafting Option		0710: CAD IV Architectural Engineering
		0708: CAD II Architectural Engineering	0709: CAD III Architectural Engineering	
		Architectural Option		
		0703: Drafting- Architectural	Add a new class: <i>Architectural Drawing</i>	
		Mechanical/Engineering Option		
		0706: Drafting-Technical/ Mechanical	Add a new class: <i>Mechanical Drawing II</i>	
Core Requirement 2			CAD Elective	CAD Elective

Program Learning Outcomes Matrix:									
Courses in the POS		Program Learning Outcomes							
STARS No.	Course Title	1	2	3	4	5	6	7	8
0702	Drafting-General								
0703	Drafting-Architectural								
0706	Drafting-Technical/Mechanical								
0708	CAD II Architecture/Engineering								
0709	CAD III Architecture/Engineering								
0710	CAD IV Architecture/Engineering								
1619	Civil Engineering and Architecture								

STARS No.	Course Descriptions:
0702	<p>Drafting-General</p> <ul style="list-style-type: none"> • Recommended for Students Grades 9-12 • Courses usually offered as a sequence of courses, introduce students to the technical craft of drawing illustrations to represent and/or analyze design specifications, and then refine the skills necessary for this craft. Drafting-General courses use exercises from a variety of applications to provide students with the knowledge and experience to develop the ability to perform freehand sketching, lettering, geometric construction, multi-view projections, and to produce various types of drawings (working, detail, assembly, schematic, perspective, and so on). Computer aided drafting (CAD) systems (if available) are typically introduced and used to fulfill course objectives.
0703	<p>Drafting-Architectural</p> <ul style="list-style-type: none"> • Recommended for Students Grades 10 - 12 • Courses introduce and refine the technical craft of drawing illustrations to represent and/or analyze design specifications, using examples drawn from architectural applications. General drafting skills are developed, but a particular emphasis is placed on interior and exterior residential (and light commercial) design, site orientation, floor plans, electrical plans, design sketches, and presentation drawings. Students may prepare scale models.
0706	<p>Drafting-Technical/Mechanical</p> <ul style="list-style-type: none"> • Recommended for Students Grades 10 – 12 • Courses introduce and refine the technical craft of drawing illustrations to represent and/or analyze design specifications, using examples drawn from industrial applications. General drafting skills are developed, but a particular emphasis is placed on sectioning, auxiliary views, revolutions, and surface development. Basic machining and fabrication processes may be introduced as students draw schematic diagrams featuring cams, gears, linkages, lever, pulleys, and so on. Drafting-Technical/Mechanical courses are often used as prerequisites for other drafting courses.
0708	<p>CAD II Architecture/Engineering</p> <ul style="list-style-type: none"> • Recommended for Students Grades 10-12 • Course expands on basic knowledge of CAD Software and design by incorporating advanced computer commands and integrating drafting systems available in industry.
0709	<p>CAD III Architecture/Engineering</p> <ul style="list-style-type: none"> • Recommended for Students Grades 10-12 • The student pursues advanced directed study in an area of Architectural/Engineering graphics, building on the skills developed in CAD Engineering I and II. The student produces a project(s) which demonstrates knowledge of Engineering content guided by the instructor. He/she has the ability to work independently, to form goals, become familiar with careers and develop work habits of professionals. Literacy is integrated throughout the course.
0710	<p>CAD IV Architecture/Engineering</p> <ul style="list-style-type: none"> • Recommended for Students Grades 11-12 • In CAD IV, a student pursues advanced individual study in an area of Architectural/Engineering graphics through an Industry work-site experience or through an independent and instructor guided project. The student assumes responsibility for identifying, pursuing, and culminating an activity that expands knowledge about some phase of the Architecture/Engineering industry. He/she researches career fields and employability requirements that fit the skills developed in this course. Literacy is integrated throughout the course.

STARS No.	Course Descriptions:
1619	Civil Engineering and Architecture <ul style="list-style-type: none">• Recommended for Students Grades 10 – 12• This course provides an overview of the fields of Civil Engineering and Architecture, emphasizing the interrelationship and dependence of both fields on each other. Students use art software to solve real world problems and communicate solutions to hands-on-projects and activities. (A “Project Lead the Way” course)

Maintenance/Operations: Employees with careers in maintenance/operations keep our future intact! These are the people who unload, inspect, and move new equipment into position. They determine the optimal placement of machines in a plant, assemble machinery, install machinery, repair machinery and perform preventive maintenance. They detect, diagnose and correct minor problems on machinery. They keep the structure of an establishment in good repair. They maintain the smooth operation of refineries, power plants, chemical plants and mills.

Program Learning Outcomes from the NASDCTE Common Career Technical Core:	
1.	Recognize and employ universal construction signs and symbols to function safely in the workplace.
2.	Use troubleshooting procedures when solving a maintenance problem in buildings.
3.	Apply construction skills when repairing, restoring or renovating existing buildings.
4.	Determine work required to repair or renovate an existing building.
5.	Plan and practice preventative maintenance activities to service existing buildings.
6.	Maintain and inspect building systems to achieve safe and efficient operation of buildings.

POS Course Sequence:				
	9 th Grade	10 th Grade	11 th Grade	12 th Grade
Career and Technical Courses and/or Degree Major Courses as Dual Credit	<i>*Introduction to the Built Environment</i>	<i>*The Language of Architecture and Construction</i> 0302 General Computer Applications 0703 Drafting-General	1614 Industrial Safety/First Aid 1813 Warehouse Operations	0473 Building Maintenance
Core Requirement 2				

Program Learning Outcomes Matrix:							
Courses in the POS		Program Learning Outcomes					
STARS No.	Course Title	1	2	3	4	5	6
302	General Computer Applications						
703	Drafting-General						
1614	Industrial Safety/First Aid						
1813	Warehouse Operations						
473	Building Maintenance						

POS Course Sequence: Pre-Architecture/Design				
	9 th Grade	10 th Grade	11 th Grade	12 th Grade
Core Requirement 1	0702: Drafting-General	0703: Drafting- Architectural	1619: Civil Engineering and Architecture	Add a new class: <i>Arch 101</i>
Core Requirement 2				Add a new class: <i>Arch 104</i>

STARS No.	Course Descriptions:

Programs of Study and Certifications Working Document

STARS No.	Course Descriptions: