Engineering Foundations
Supplemental Program Resources

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Supplemental Program Resources 2023

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Introduction

This document provides supplemental information for the Engineering Foundations 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.

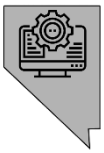
The Equipment List for the Engineering Foundations program of study is included and, if applicable, additional items used only in the complementary course(s) are noted.

The Crosswalks and Alignments connect and support the Engineering Foundations standards for the Science, Technology, Engineering, and Mathematics 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.

Engineering Foundations



The Engineering Foundations program provides students the opportunity to learn various aspects of engineering fundamentals that would be required for any engineering field. Areas of study include safety, the engineering design process, impacts of engineering on society, sketching and documentation methods, material properties, power systems and energy principles, as well as statistics and kinematic principles.

Science, Technology, Engineering, and Mathematics Career Cluster

Science, Technology, Engineering, and Mathematics® is focused on planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.

Postsecondary Options

Certificate/License

- Instrumentation Technology CA (GBC)
- Electrical Systems Technology (GBC)

Associate Degrees

- Engineering Technology: Utilities-Electrical Power AAS (CSN)
- Engineering Technology: Utilities-Natural Gas AAS (CSN)
- Engineering AS (TMCC, WNC)

Bachelor's Degree

- Mechanical Engineering (UNLV, UNR)

NEVADA Department of Education

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For additional information on this cluster, please contact:
cteinfo@doe.nv

Website: https://doe.nv.gov/offices/craleo/cte

Approved Courses

Engineering Foundations I
Engineering Foundations II
Engineering Foundations II Lab

Complementary Courses

Engineering Foundations Advanced Studies
Aerospace Engineering
Architectural and Civil Engineering
Electrical Engineering
Environmental Engineering
Mechanical Engineering
CTE Work Experience – Science, Technology, Engineering, and Mathematics
Industry Recognized Credential- Engineering Foundations

Work-Based Learning Opportunities

Job Shadowing / Internship / CTE Work Experience/ School-based Enterprise/ Apprenticeship Ready Programs

Career and Technical Student Organization

SkillsUSA SkillsUSA NEVADA TSA NEVADA TSA TECHNOLOGY STUDENT ASSOCIATION

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
Electrical Installers and Repairers	$61,760	9,900	-1.0%
Solar Photovoltaic Installers	$47,670	2,500	27.0%
Power Generating Plant Operator	$94,790	3,200	-15.0%
Power Distribution Engineer	$101,780	20,100	3.0%
Line Installers and Repairers	$74,530	23,500	6.0%
Electrical Technician	$63,640	11,100	0.0%

Source U.S. Bureau of Labor Statistics 2022

Program Structure for Engineering Foundations

The core course sequencing is provided in the following table. Complementary Courses are available and provided later in this document. The following courses provide a completed program of study. The Lab is a complementary course available concurrently with the Engineering Foundations 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	Engineering Foundations I	ENG FOUND I	14.0101	21	005	G	1.00	12	21005G1.0012
R	Engineering Foundations II	ENG FOUND II	14.0101	21	005	G	1.00	22	21005G1.0022
C	Engineering Foundations II LAB	ENG FOUND II L	14.0101	21	005	E	1.00	22	21005E1.0022

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	Engineering Foundations Advanced Studies	ENG FOUND AS	14.0101	21	005	E	1.00	11	21005E1.0011
C	Aerospace Engineering	AEROSPACE ENG	14.0102	21	013	E	1.00	11	21013E1.0011
C	Architectural and Civil Engineering	CIVIL ENG	14.0401	21	011	E	1.00	11	21011E1.0011
C	Electrical Engineering	ELEC ENG	15.0303	21	008	E	1.00	11	21008E1.0011
C	Environmental Engineering	ENVIRON SUS ENG FOUND	14.0501	21	014	E	1.00	11	21014E1.0011
C	Mechanical Engineering	MECH ENGR	14.1901	21	010	E	1.00	11	21010E1.0011
C	Industry Recognized Credential - Engineering Foundations	IRC FOUND	14.0101	21	999	E	1.00	11	21999E1.0011
C	CTE Work Experience - Science, Technology, Engineering, and Mathematics	WORK EXPER STEM	99.0015	21	998	G	1.00	11	21998G1.0011

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

Engineering Foundations I

Prerequisite: None

This course is the entry-level course of the Engineering curriculum. The major focus of this course is the design process and its application. Through hands-on projects, students apply engineering standards and document their work. Students use industry-standard 3D modeling software to help them design solutions to solve proposed problems, document their work using an engineer's notebook, and communicate solutions to peers and members of the professional community.

Engineering Foundations II

Prerequisite: Engineering Foundations I

This course is a continuation of the Engineering curriculum. This survey course exposes students to major concepts they will encounter in a postsecondary engineering course of study. Topics include mechanisms, energy, statics, materials, and kinematics. They develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges, document their work, and communicate solutions.

Engineering Foundations II LAB

Prerequisite: Concurrent enrollment in Engineering Foundations 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.

Engineering Foundations Advanced Studies

Prerequisite: Completion of Engineering Foundations Program of Study

This course is offered to students who have completed all content standards in the Engineering Foundations program of study 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.

Aerospace Engineering

Prerequisite: Completion of Engineering Foundations Program of Study

This course is offered to students who have completed all content standards in the Engineering Foundations program of study. This course explores the evolution of flight, navigation and control, flight fundamentals, aerospace materials, propulsion, space travel, and orbital mechanics. In addition, this course presents alternative applications for aerospace engineering concepts. Students analyze, design, and build aerospace systems. They apply knowledge gained throughout the course in a final presentation about the future of the industry and their professional goals.

Architectural and Civil Engineering

Prerequisite: Completion of Engineering Foundations Program of Study

This course is offered to students who have completed all content standards in the Engineering Foundations program of study. Students learn about various aspects of civil engineering and architecture and apply their knowledge to the design and development of residential and commercial properties and structures. In addition, students use 3D design software to design and document solutions for major course projects. Students communicate and present solutions to their peers and members of a professional community of engineers and architects.

Electrical Engineering

Prerequisite: Completion of Engineering Foundations Program of Study

This course is offered to students who have completed all content standards in the Engineering Foundations program of study. Digital electronics is the foundation of all modern electronic devices such as mobile phones, MP3 players, laptop computers, digital cameras, and high-definition televisions. Students are introduced to the process of combinational and sequential logic design, engineering standards, and technical documentation.

Environmental Engineering

Prerequisite: Completion of Engineering Foundations Program of Study

This course is offered to students who have completed all content standards in the Engineering Foundations program of study. In this course students investigate and design solutions in response to real-world challenges related to clean and abundant drinking water, food supply issues, and renewable energy. Applying knowledge of engineering, biology, and ecology through hands-on activities and simulations, students research and design potential solutions to these true-to-life challenges.

Mechanical Engineering

Prerequisite: Completion of Engineering Foundations Program of Study

This course is offered to students who have completed all content standards in the Engineering Foundations program of study. Students explore how things are made and the different processes that go into creating various products. Additionally, students learn about the history of manufacturing, the evolution of robotics and automation, manufacturing processes, computer modeling, manufacturing equipment, and flexible manufacturing systems.

Industry-Recognized Credential – Engineering Foundations

Prerequisite: Completion of Engineering Foundations Program of Study

This course is offered to students who have completed all content standards in the Engineering Foundations program of study and desire to pursue an Industry-Recognized Credential that aligns with the standards and skills associated with the Engineering Foundations 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 – Science, Technology, Engineering, and Mathematics

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 an Engineering Foundations program.

CTE Classroom Equipment **Total: $1,560**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
2	Storage Cabinets (36” x 12” x 72”) (lockable)	$400	$800
1	Eyewash Station	$300	$300
2	Fire Extinguisher	$130	$260
1	Sink with Soap Dispenser	$100	$100
1	First Aid Kit	$100	$100

Program Equipment **Total: $158,100**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
25	Student Computers (enhanced memory/storage, download capable, able to run 3d modeling specifications)	$1,500	$37,500
1	Teacher Computer (enhanced memory/storage, download capable, able to run 3d modeling specifications)	$2,000	$2,000
1	Technology Storage/Charging System	$3,000	$3,000
7	Advanced Robotics Kits	$1,500	$10,500
1	Pneumatic for robotics	$300	$300
1	Storage cabinet for sanitized eye protection	$800	$800
2	Wood Router and Bits	$300	$600
2	Router Table	$300	$600
1	Saw Stop Table Saw	$3,000	$3,000
1	Movable Lumber Storage Rack	$800	$800
1	Thickness Planer	$2,000	$2,000
1	Lumber Jointer	$2,000	$2,000
1	Specialized 3D printer	$20,000	$20,000
4	Standard 3D printer	$1,000	$1,000

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QTY	ITEM DESCRIPTION	UNIT	TOTAL
1	Laser cutter	$15,000	$15,000
1	CNC milling machine (12R)	$10,000	$10,000
1	Small water jet	$20,000	$20,000
3	Midi benchtop lathe	$800	$2,400
1	Tool storage	$2,000	$2,000
1	Arduino kits and parts	$600	$600
3	Tabletop band saw	$1,000	$3,000
3	Tabletop scroll saw	$1,000	$3,000
2	Bench sanders	$1,500	$3,000
1	Ventilation system	$1,000	$1,000
1	Dust collection	$2,000	$2,000
3	Drill Press	$1,500	$4,500
10	Dual power-power supply	$150	$1,500
Varies	Hand Power Tools (Drill, sander, impact driver, etc.)	$3,000	$3,000
1	Vernier Sensors	$3,000	$3,000

Instructional Materials **Total: $8,000**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
25	Student Textbooks Approved CTE Instructional Materials list can be found here.	$100	$2,500
1	Teacher Textbook Edition and Resources	$500	$500
Varies	Instructional Resources (computer-aided design and drafting [CADD] software with site license, manuals, posters, etc.)	$5,000	$5,000

Instructional Supplies **Total: $14,500**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
7	Dual-range Force Sensors	$150	$1,050
2	Compact Scales (2000 g x 1 g)	$125	$250
7	Variable DC Power Supplies (18V 0-2A)	$150	$700
15	Digital Multimeter	$100	$1,500
15	Dial Calipers (6” steel, graduated to 0.001 inches)	$50	$750

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QTY	ITEM DESCRIPTION	UNIT	TOTAL
Varies	Supplies (various types of paper, sketching pencils/paints, lead, erasers, ink cartridges, etc.)	$2,500	$2,500
Varies	Project supplies (LEDs [light emitting diodes] in various colors, single AAA battery holders, push-button switches, resistor kits and wires, solderless breadboards, alligator leads, 1" masking tape, low-temp full-size glue gun, glue sticks, various syringes, items for sorting, etc.)	$4,000	$4,000
Varies	Tools and Hardware (25' metal tape measures, clamp lights and bulbs, adjustable wrenches, wrench sets, wire strippers, needle nose pliers, locking pliers, hex key sets, hacksaws and blades, files and file handles, hickory handle hammers, drill bits, precision screwdriver sets, S-hooks, utility knives and blades, etc.)	$2,000	$2,000
Varies	Computer Accessories (cases, covers, etc.) (optional)	$500	$500
Varies	Clamps (various sizes)	$250	$250
Varies	Personal Protective Equipment (PEE) (gloves, safety glasses/goggles, etc.)	$1,000	$1,000

Other **Total: $1,275**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
1	Occupational Safety and Health Administration (OSHA) Instructor Training	$300	$300
25	Occupational Safety and Health Administration (OSHA) Student Exams	$39	$975

Category Totals:

Classroom Equipment	$1,560
Program Equipment	$158,100
Instructional Materials	$8,000
Instructional Supplies	$14,500
Other	$1,275
Estimated Program Total	**$183,435**

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Complementary Course(s) Equipment List Addendum

Aerospace Engineering

Instructional Materials **Total: $5,000**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
1	3D Modeling Computer-aided Design (CAD) software with site license, manuals, posters, etc.)	$5,000	$5,000

Instructional Supplies **Total: $11,450**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
5	Cordless Drills (14 volt or higher)	$100	$500
5	Balsa Wood Strips, 3/32” x 3/32” x 36” (100 pack)	$50	$250
5	Self-Healing Cutting Mat (11.8” x 8.7”, package of 6)	$100	$500
2	Drill Press Vise (4” capacity)	$100	$200
Varies	Aerospace Project Materials (including rocket engine build supplies, fiber glass tape, insulation, sheeting plastic, centering rings, parachute recovery, body tubes	$10,000	$10,000

Category Totals:

Instructional Materials	$5,000
Instructional Supplies	$11,450
Estimated Complementary Course Total	**$16,450**

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Complementary Course(s) Equipment List Addendum

Architectural and Civil Engineering

Program Equipment **Total: $2,500**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
1	Networkable Large Format Color Plotter	$2,500	$2,500

Instructional Supplies **Total: $1,450**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
5	Cordless Drills (14 volt or higher)	$100	$500
5	Balsa Wood Strips (3/32” x 3/32” x 3/32”)	$50	$250
5	Self-healing Cutting Mats	$100	$500
2	Drill Press Vise	$100	$200

Category Totals:

Program Equipment	$2,500
Instructional Supplies	$1,450
Estimated Complementary Course Total	**$3,950**

Complementary Course(s) Equipment List Addendum

Electrical Engineering

Program Equipment **Total: $32,500**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
3	Waveform Analyzer	$2,500	$7,500
3	Digital, Analog, RF and Audio Signal Generators	$2,500	$7,500
7	Analog Oscilloscopes	$1,000	$7,000
7	Video Signal Generators	$1,000	$7,000
7	Mounted Soldering Stations	$500	$3,500

Instructional Supplies **Total: $6,000**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
Varies	Supplies (soldering materials, bread boards, circuit board material, transistors, resistors, integrated circuits, switches, etc.)	$3,000	$3,000
Varies	Microcontrollers	$1,500	$1,500
Varies	Circuit Board holders, various sizes	$1,500	$1,500

Category Totals:

Program Equipment	$32,500
Instructional Supplies	$6,000
Estimated Complementary Course Total	**$38,500**

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Complementary Course(s) Equipment List Addendum

Environmental Engineering

Program Equipment **Total: $7,000**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
7	Microscopes (for handling water quality samples)	$1,000	$7,000

Instructional Supplies **Total: $6,900**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
7	Water Samples	$300	$2,100
7	Ecological Water Lab Test Kits (or equivalent)	$200	$1,400
7	Biofuel Test Kits (or equivalent)	$200	$1,400
Varies	Environmental Project Supplies (pH test kits, beakers, volume measurement tools, test tubes, test slides, etc.)	$2,000	$2,000

Category Totals:

Program Equipment	$7,000
Instructional Supplies	$6,900
Estimated Complementary Course Total	**$13,900**

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Complementary Course(s) Equipment List Addendum

Mechanical Engineering

Program Equipment **Total: $32,500**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
1	Computer Numerical Control (CNC) Mill	$20,000	$20,000
1	Networkable Large Format Color Plotter	$2,500	$2,500
1	3D Printers and Supplies	$10,000	$10,000

Instructional Materials **Total: $5,500**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
1	3D Modeling Computer-aided Design (CAD) Software with site license, instructional resources, manuals, posters, etc.	$5,500	$5,500

Instructional Supplies **Total: $700**

QTY	ITEM DESCRIPTION	UNIT	TOTAL
5	Cordless Drills (14 volt or higher)	$100	$500
2	Drill Press Vise	$100	$200

Category Totals:

Program Equipment	$32,500
Instructional Materials	$5,500
Instructional Supplies	$700
Estimated Complementary Course Total	**$38,700**

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 Engineering Foundations Standards show connections with the Nevada Academic Content Standards. The crosswalk identifies the performance indicators in which the learning objectives in the Engineering Foundations 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 Engineering Foundations Standards Performance Indicators and the Mathematical Practices. This alignment identifies the performance indicators in which the learning objectives in the Engineering Foundations 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 Engineering Foundations Standards Performance Indicators and the Science and Engineering Practices. This alignment identifies the performance indicators in which the learning objectives in the Engineering Foundations program connect with and support academic learning.

Crosswalks (Common Career Technical Core)

The crosswalks of the Engineering Foundations Standards show connections with the Common Career Technical Core. The crosswalk identifies the performance indicators in which the learning objectives in the Engineering Foundations 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 Engineering Foundations Standards are crosswalked to the Science, Technology, Engineering, and Mathematics Career Cluster™ and the Engineering and Technology Career Pathway.

Crosswalk of Engineering Foundations Program of Study Standards and the Nevada Academic Content Standards

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.11-12.3	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.	2.1.1, 2.1.19, 2.1.20; 4.1.3, 5.3.1; 7.2.3
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.	2.1.15, 2.1.16; 5.1.4, 5.3.1, 5.4.1, 5.4.3
RST.11-12.5	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.	2.1.15, 2.1.16
RST.11-12.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	2.1.16
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.	3.1.5, 3.1.6; 7.4.4, 7.4.5, 7.5.3, 7.6.2, 7.6.4
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.	2.1.1, 2.1.2, 2.1.10, 2.1.20, 3.1.4, 3.2.5; 4.1.4, 6.1.3, 6.2.1; 7.1.4, 7.1.11, 7.2.1, 7.4.4, 7.5.5

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; 2.1.2
SL.11-12.1d	Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.	2.1.19; 3.1.6; 7.5.5
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.11-12.4	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; 7.1.13, 7.5.6

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; 2.1.1, 2.1.2, 2.1.10, 2.1.15, 2.1.17, 3.1.4, 3.2.5; 6.1.3, 6.2.12, 7.1.4, 7.5.5
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.11-12.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate;	4.1.3, 4.1.4; 5.3.3, 5.5.3, 6.1.2, 6.1.5; 7.6.4

	synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	
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; 3.2.1, 3.2.2, 3.2.3, 3.2.4; 6.1.4, 6.2.1; 7.1.4
WHST.11-12.9	Draw evidence from informational texts to support analysis, reflection, and research.	2.1.15; 6.2.3; 7.1.9, 7.1.11, 7.4.5, 7.5.3

Math: Algebra – Arithmetic with Polynomials and Rational Expressions

Nevada Academic Content Standards		Performance Indicators
AAPR.C.5	(+) Know and apply the Binomial Theorem for the expansion of (x + y) n in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.	7.5.7

Math: Algebra – Reasoning with Equations and Inequalities

Nevada Academic Content Standards		Performance Indicators
AREI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	6.2.6, 6.2.10, 6.2.11; 7.1.5, 7.2.3, 7.2.4, 7.2.5, 7.3.4, 7.3.5, 7.3.6, 7.3.7, 7.3.12, 7.5.7, 7.5.8; 8.2.2, 8.2.3, 8.2.5

Math: Algebra – Seeing Structure in Expressions

Nevada Academic Content Standards		Performance Indicators
ASSE.A.1	Interpret expressions that represent a quantity in terms of its context.	6.2.3

Math: Geometry – Congruence

Nevada Academic Content Standards		Performance Indicators
GCO.A.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	5.1.3

Math: Number & Quantity – Qualities

Nevada Academic Content Standards		Performance Indicators
NQ.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	5.2.2, 5.2.3, 5.2.5
NQ.A.2	Define appropriate quantities for the purpose of descriptive modeling.	5.2.6; 6.2.2

Math: Number & Quantity – The Complex Number System

Nevada Academic Content Standards	Performance Indicators
NVM.A.1 (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments and use appropriate symbols for vectors and their magnitudes (e.g., v, |v|, ||v||, v).	6.2.7, 6.2.8
NVM.A.2 (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.	6.2.9; 8.2.4

Math: Statistics and Probability – Conditional Probability and the Rules of Probability

Nevada Academic Content Standards	Performance Indicators
SCP.A.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).	8.1.5
SCP.A.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	8.1.2
SCP.A.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.	8.1.3

Math: Statistics and Probability – Making Inferences and Justifying Conclusions

Nevada Academic Content Standards	Performance Indicators
SIC.B.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	8.1.6

Math: Statistics and Probability – Interpreting Categorical and Quantitative Data

Nevada Academic Content Standards	Performance Indicators
SID.A.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	8.1.8, 8.1.9

Science HS: Earth and Human Activity

Nevada Academic Content Standards		Performance Indicators
HS-ESS3-1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	6.1.3
HS-ESS3-2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	6.1.2, 6.1.4

Science HS: Engineering Design

Nevada Academic Content Standards		Performance Indicators
HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	4.1.4

Science HS: Motion and Stability – Forces and Interactions

Nevada Academic Content Standards		Performance Indicators
HS-PS2-1	Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.	6.2.4, 6.2.11; 8.2.3
HS-PS2-2	Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.	6.2.10

Science HS: Energy

Nevada Academic Content Standards		Performance Indicators
HS-PS3-1	Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.	7.1.7
HS-PS3-4	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	7.3.11, 7.6.5

Alignment of Engineering Foundations Standards and the Mathematical Practices

Mathematical Practices	Engineering Foundations Performance Indicators
1. Make sense of problems and persevere in solving them.	6.2.3
2. Reason abstractly and quantitatively.	7.1.11
3. Construct viable arguments and critique the reasoning of others.	
4. Model with mathematics.	5.1.3, 5.5.1; 6.2.4, 6.2.5
5. Use appropriate tools strategically.	5.2.3, 5.2.6; 7.3.3
6. Attend to precision.	5.4.8; 7.3.3
7. Look for and make use of structure.	7.2.4, 7.2.5, 7.3.11, 7.3.12
8. Look for and express regularity in repeated reasoning.	5.2.5

Alignment of Engineering Foundations Standards and the Science and Engineering Practices

Science and Engineering Practices	Engineering Foundations Performance Indicators
1. Asking questions (for science) and defining problems (for engineering).	8.2.5
2. Developing and using models.	5.5.2, 5.5.3, 7.2.6
3. Planning and carrying out investigations.	7.3.8, 7.3.9, 7.3.10, 7.5.9
4. Analyzing and interpreting data.	7.1.11
5. Using mathematics and computational thinking.	6.2.2, 6.2.6, 6.2.10; 7.2.4, 7.2.5 7.3.12, 7.6.5; 8.2.2, 8.2.3
6. Constructing explanations (for science) and designing solutions (for engineering).	6.2.12; 8.2.6
7. Engaging in argument from evidence.	
8. Obtaining, evaluating, and communicating information.	6.2.12

Crosswalks of Engineering Foundations Standards and the Common Career Technical Core

Science, Technology, Engineering, and Mathematics Career Cluster	Performance Indicators
1. Apply engineering skills in a project that requires project management, process control and quality assurance.	4.1.1, 4.1.2, 4.1.3, 4.1.5 5.3.1, 5.3.2, 5.3.3, 5.3.4 5.4.9
2. Use technology to acquire, manipulate, analyze, and report data.	5.3.4, 5.4.2, 7.3.3
3. Describe and follow safety, health and environmental standards related to science, technology, engineering, and mathematics (STEM) workplaces.	2.1.2 - 2.1.20
4. Understand the nature and scope of the Science, Technology, Engineering, and Mathematics Career Cluster and the role of STEM in society and the economy.	3.1.2, 3.1.3, 3.1.5, 3.2.3 4.1.4
5. Demonstrate an understanding of the breadth of career opportunities and means to those opportunities in each of the Science, Technology, Engineering, and Mathematics Career Pathways.	3.1.3, 3.1.4, 3.1.5
6. Demonstrate technical skills needed in a chosen STEM field.	7.1.11, 7.3.3

Engineering and Technology Career Pathway	Performance Indicators
1. Use STEM concepts and processes to solve problems involving design and/or production.	7.1.13
2. Display and communicate STEM information.	5.3.1, 5.3.2, 5.3.3; 6.2.12
3. Apply processes and concepts for the use of technological tools in STEM.	5.1.3; 7.3.3, 7.4.1, 7.4.2 7.4.3, 7.4.4
4. Apply the elements of the design process.	4.1.1, 4.1.2, 4.1.3, 4.1.5
5. Apply the knowledge learned in STEM to solve problems.	6.2.12; 7.4.6
6. Apply the knowledge learned in the study of STEM to provide solutions to human and societal problems in an ethical and legal manner.	3.2.3, 3.2.5; 7.1.4, 7.1.11

Science and Mathematics Career Pathway	Performance Indicators
1. Apply science and mathematics to provide results, answers, and algorithms for engineering and technological activities.	6.2.12; 7.2.4, 7.2.5, 7.3.4 7.3.5
2. Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.	6.1.3, 6.1.4, 6.1.5; 7.1.4
3. Analyze the impact that science and mathematics has on society.	3.2.3
4. Apply critical thinking skills to review information, explain statistical analysis, and to translate, interpret and summarize research and statistical data.	7.1.11; 8.1.4, 8.1.6