

# Wyoming Department of Education Required Virtual Education Course Syllabus

## Niobrara County School District # 1

Program Name	Wyoming Virtual Academy	Content Area	VE
Course ID	D-CAR-031V1-DYN	Grade Level	9-12
Course Name	Engineering Explorations	# of Credits	0.5
SCED Code	21005G0.5011	Curriculum Type	K12 Inc

### COURSE DESCRIPTION

This course guides students through an investigation of engineering careers. Students are introduced to the basics of engineering, learn how to turn problems into ideas, and develop a basic understanding of civil, mechanical, chemical, and biological engineering.

### WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	<a href="#">BENCHMARK (Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets</a>
CV12.2.1	College and career-ready students communicate clearly, effectively, and with reason.
CV12.2.2	College and career-ready students identify and model integrity, ethical leadership and effective management skills.
CV12.2.3	College and career-ready students work productively in teams while using cultural global competence.
CV12.2.4	College and career-ready students apply safe, legal, and responsible use of information and technology as appropriate to the task.
CV12.3.1	College and career-ready students identify and define authentic problems and significant questions for investigation.
CV12.3.2	College and career-ready students identify trends, forecast possibilities, and explore complex systems and issues.
CV12.3.4	College and career-ready students demonstrate creativity and innovation while considering the environmental, social, and economic impacts of decisions.
CV12.4.1	College and career-ready students produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (*CCSS W.11.4)
CV12.4.2	College and career-ready students determine the meaning of symbols, key terms, and other content-specific words and phrases as they are used in technical context. (*Adapted from CCSS RL.9.11)
CV12.4.3	College and career-ready students acquire, manipulate, analyze, diagnose, and/or report information, using the appropriate technology.
CV12.5.1	College and career-ready students manage resources to develop, analyze, and implement systems and applications.

CV12.5.2	College and career-ready students productively complete tasks taking constraints, priorities and resources into account.	
CV12.5.3	College and career-ready students safely and ethically use current industry-standard tools and emerging technologies.	
CV12.5.4	College and career-ready students utilize technology to develop innovative solutions or products.	
SCOPE AND SEQUENCE		
UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
Unit 1: Development and Understanding of Engineering Lessons 1-14	CV12.2.1 CV12.2.2 CV12.2.4 CV12.3.1 CV12.3.2 CV12.3.4 CV12.4.1 CV12.4.2 CV12.4.3	<ul style="list-style-type: none"> <li>Distinguish the differences between science, technology, and engineering.</li> <li>Understand and use technical terms.</li> <li>Discuss important technological developments from the past.</li> <li>Identify the various technological ages and the rate of current development.</li> <li>Discuss some of the ethical concerns around technology.</li> </ul>
Unit 2: Making Problems into Ideas Lessons 1-14	CV12.2.1 CV12.2.2 CV12.2.4 CV12.3.1 CV12.3.2 CV12.3.4 CV12.4.1 CV12.4.2 CV12.4.3 CV.12.5.1 CV12.5.2 CV12.5.3 CV12.5.4	<ul style="list-style-type: none"> <li>Discuss open and closed systems.</li> <li>Identify how technological systems interact to achieve goals.</li> <li>Find technological solutions through problem solving.</li> <li>Design and maintain a computation engineering notebook.</li> </ul>
Unit 3: From Sketches to Products Lessons 1-14	CV12.2.1 CV12.2.2 CV12.2.4 CV12.3.1 CV12.3.2 CV12.3.4 CV12.4.1 CV12.4.2 CV12.4.3	<ul style="list-style-type: none"> <li>Describe the fundamental processes needed for a project, including design and prototype development.</li> <li>Identify the chemical, mechanical, and physical properties of engineering materials.</li> <li>Assess risks and benefits of a design solution.</li> <li>Maintain a professional portfolio.</li> </ul>
Unit 4: Civil Engineering Lessons 1-14	CV12.2.1 CV12.2.2 CV12.2.3 CV12.2.4	<ul style="list-style-type: none"> <li>Work in teams to apply the design process.</li> <li>Assume different roles within an engineering project.</li> </ul>

	CV12.3.1 CV12.3.2 CV12.3.4 CV12.4.1 CV12.4.2 CV12.4.3 CV.12.5.1 CV12.5.2 CV12.5.3 CV12.5.4	<ul style="list-style-type: none"> <li>• Develop and test a project model.</li> <li>• Use time-management skills to meet project objectives.</li> <li>• Use criteria to meet project expectations.</li> <li>• Describe and demonstrate team functions, quality, and requirements.</li> </ul>
Unit 5: Mechanical Engineering Lessons 1-13	CV12.2.1 CV12.2.2 CV12.2.4 CV12.3.1 CV12.3.2 CV12.3.4 CV12.4.1 CV12.4.2 CV12.4.3 CV.12.5.1 CV12.5.2 CV12.5.3 CV12.5.4	<ul style="list-style-type: none"> <li>• Define and describe the applications of physical and mechanical systems.</li> <li>• Describe various career opportunities and emerging issues within these fields.</li> <li>• Explain the history of mechanical engineering and its current trajectory.</li> <li>• Apply design concepts to problems in physical and mechanical systems.</li> </ul>
Unit 6: Chemical Engineering	CV12.2.1 CV12.2.2 CV12.2.4 CV12.3.1 CV12.3.2 CV12.3.4 CV12.4.1 CV12.4.2 CV12.4.3 CV.12.5.1 CV12.5.2 CV12.5.3 CV12.5.4	<ul style="list-style-type: none"> <li>• Describe applications of process control and automation systems.</li> <li>• Describe career opportunities in process control and automation systems.</li> <li>• Apply design concepts and identify fields related to process control and automation systems while identifying emerging issues.</li> <li>• Understand and follow safety tests and guidelines while recognizing how to classify and dispose of hazardous materials and waste.</li> </ul>
Unit 7: Biological Engineering	CV12.2.1 CV12.2.2 CV12.2.4 CV12.3.1 CV12.3.2 CV12.3.4 CV12.4.1 CV12.4.2 CV12.4.3 CV.12.5.1 CV12.5.2 CV12.5.3 CV12.5.4	<ul style="list-style-type: none"> <li>• Describe the different fields of biotechnology.</li> <li>• Identify the underlying principles of bioengineering.</li> <li>• Understand career opportunities, related fields, and emerging trends in biotechnology.</li> <li>• Apply design concepts to problems in biotechnology.</li> <li>• Discuss inherent ethical dilemmas in bioengineering and technology.</li> </ul>

Unit 8: Impossible Engineering Lesson 1-13	CV12.2.1 CV12.2.2 CV12.2.4 CV12.3.1 CV12.3.2 CV12.3.4 CV12.4.1 CV12.4.2 CV12.4.3	<ul style="list-style-type: none"><li>• Define impossible engineering.</li><li>• Conduct and present research on emerging and innovative technology.</li><li>• Describe ethical behavior and decision making through the use of examples.</li><li>• Differentiate among discrimination, harassment, and equality.</li></ul>
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