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## High School Courses

**CESI Pathway Codes: SC001 Engineering and Technology or SC002 Science and Mathematics**

**8704 Advanced Biotechnology I – 1 unit (CESI: ST00026)**

This is a course that is intended for students who have excelled in Biotechnology I and II. It will challenge them to gain knowledge in upper-level biochemistry, microbiology, and lab techniques. Lab reports are an integral part of this course, as well as bioinformatics. Students will be expected to do independent research projects.

**8717 Advanced Biotechnology II (Oklahoma’s Promise – Science Credit) – 1 unit (CESI: ST00040)**

This is a course that is intended for students who have excelled in Biotechnology I and II and have taken Advanced Biotechnology I. This course encompasses upper-level biochemistry, microbiology, and lab techniques. Lab reports are an integral part of this course, as well as bioinformatics. Students will be expected to do independent research projects.

**8826 Advanced Design Applications – 1 unit (CESI: ST00125)**

This is an advanced Engineering design course for upper-level High Schools students. This course allows students to research and apply technology principles to a hands-on project.

**8882 Advanced Mechanical Design Engineering (Oklahoma’s Promise – Computer Credit) – 1 unit (CESI: ST00275)**

Students will develop an understanding of the attributes of design and the design process. Students learn the value of sustainable design with Autodesk Fusion 360 and gain future career skills.

**8160 Advanced Programming (Oklahoma’s Promise – Computer Science Credit) – 1 unit (CESI: BT00016)**

Students will be able to demonstrate an understanding of programming languages by implementing and writing programs employing various techniques.

**8866 Advanced Robotics Engineering (Oklahoma’s Promise – Computer Credit) – 1 unit (CESI: ST00255)**

This is an advanced robotics engineering and automation course that delivers thorough and engaging STEM education. This course should deliver comprehensive, standards-based instruction through relevant activities and engagement. This introduces the design method in C programming software and robotics hardware building. It ultimately teaches science, technology, engineering and math in a robotics-based, exciting, refreshing and engaging environment for students.

**8825 Advanced Technological Applications – 1 unit (CESI: ST00191)**

Advanced Technological Applications is a 36-week course that presents four nine-week learning units. The course is standards-based, with engineering-related curricula designed for upper-level high school students. The goal is to provide an engineering or technical base for high school students who plan to continue their education in technical or engineering programs at the community college or university level. There are eight separate learning units that include both instructor and student guides.

**8862 Advanced Technology for Design Production – 1 unit (SREB Curriculum) (CESI: ST00251)**

This course will engage students in the use of modern technologies in the design and improvement of products. Students will use three-dimensional CAD software in the creation and analysis process. Students will document designs using standards set by industry for design documentation. Students will implement methods of green production and just-in-time component supply which allow for the lowest cost and highest quality products. Students will design and troubleshoot data acquisition, programmable logic control, process monitoring, automation and robotic systems. Students will incorporate sensing and vision systems, utilizing cameras and sensors to control automated systems.

**8868 Aeroponics/Hydroponics/Aquaponics – 1 unit****(CESI: ST00257)**

This course will look at the basic building and sustaining an aquaponics, hydroponics or aeroponic system. It will include the study of engineering the right system for space, location, and the desired outcome of plants and/or fish. Also, the basic plant and/or fish anatomy and physiology as well as understanding of plant and/or fish nutrition, maintaining a healthy system for plants and fish, and study how aquaponics, hydroponics or aeroponics can be used to help with food deserts and produce a sustainable food supply for the future.

**8985 Aerospace Capstone – 1 unit****(CESI: ST00284)**

Internships, project-based instruction, and additional industry certifications will be utilized to reinforce skills obtained within any Science, Technology, Engineering and Math Education (STEM) state program area. Students will make final preparations for industry certifications or college as they master competencies; select from various project options to finalize portfolios that highlight skills and/or certifications; and may undertake special projects, cross-train or participate in workplace learning opportunities to enhance skills in accordance with industry demands.

**8859 Aerospace I - 1 unit****(CESI: ST00246)**

Aerospace involves the study of the science, design, and manufacturing of flying vehicles, both within and out of the earth's atmosphere, applications of the Physical Science and Earth and Space Sciences and uses the science and engineering practices to design solutions for real-world problems.

**8885 Aircraft Material and Corrosions Control - 1 Unit****(CESI: ST00280)**

This course covers cleaning and corrosion control, as well as materials, hardware, and processes. The course aligns to FAA-ACS-AM-IG-CCC – Cleaning and Corrosion Control and FAA-ACS-AM-IE-MHP – Materials, Hardware, and Processes.

**8853 AP Computer Science A (CSA) (Oklahoma's Promise – Computer Science Credit) – 1 unit (CESI: ST00208)**

AP Computer Science A is an introductory college-level computer science course. Students cultivate their understanding of coding through analyzing, writing, and testing code as they explore concepts like modularity, variables, and control structures.

**8851 AP Computer Science Principles (Oklahoma's Promise – Computer Science Credit) – 1 unit (CESI: ST00200)**

AP Computer Science Principles is an introductory college-level computing course that introduces students to the breadth of the field of computer science. Students learn to design and evaluate solutions and to apply computer science to solve problems through the development of algorithms and programs. They incorporate abstraction into programs and use data to discover new knowledge. Students also explain how computing innovations and computing systems—including the internet, explore their potential impacts, and contribute to a computing culture that is collaborative and ethical. *This course is endorsed by the College Board, giving students the opportunity to take the AP CSP exam for college credit.*

**8886 Applied Science of Aircraft Maintenance - (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: ST00282)**

This course aligns to FAA-ACS-AM-IK-HTM – Hand Tools and Measuring Devices, FAA-ACS-AM-IJ-PFA -Physics for Aviation, FAA-ACS-AM-IH-MAT - Mathematics, FAA-ACS-AM-IC-WAB – Weight and Balance, FAA-ACS-AM-IB-ACD – Aircraft Drawings and FAA-ACS-AM-ID-FLF – Fluid Lines and Fittings.

**8903 Architecture CAD and Design (Oklahoma's Promise – Computer Credit) – 1 unit****(CESI: TI00880)**

This course is a basic Architectural Drafting course utilizing Computer-Aided Drafting and Design (CADD) software that develops computer skills and electronic skills and applications within the field of architectural drafting. Topics covered are advanced computer operations, introduction to residential architecture drafting, CADD application software, site conditions/plot plans, lettering and tools, residential design/room layout, structural systems and building materials, working drawings/floor plans and details, dimensioning, foundations, electrical/mechanical/plumbing, presentation drawings, interior and exterior elevations, roof plans, commercial architectural drafting, structural steel framing plans, pre-cast concrete, framing plans, foundations and walls and structural wood.

**8880 Architecture Design Engineering (Oklahoma's Promise – Computer Tech Credit) – 1 unit (CESI: ST00273)**

Students will develop an understanding of the attributes of design and the design process. Students learn the value of sustainable design with Autodesk Revit and gain future career skills.

**8874 Aviation I – 1 unit**

**(CESI: ST00263)**

This course is the first course in aviation pathway. Some possible courses are below:

- **Launching into Aviation**
- **Exploring Aviation & Aerospace**

**8875 Aviation II – (Oklahoma's Promise – Computer Credit) – 1 unit**

**(CESI: ST00264)**

This course is the second course in the aviation pathway. Some possible courses are below:

- **Introduction to Flight**
- **Aircraft Systems and Performance**

**8876 Aviation III – Pilot (Oklahoma's Promise – Computer Credit) – 1 unit**

**(CESI: ST00265)**

This is the third course in the aviation pathway. Some possible courses are below:

- **The Flying Environment**
- **Flight Planning**

**8876 Aviation III – UAS -- (Oklahoma's Promise – Computer Credit) – 1 unit**

**(CESI: ST00267)**

This is the third course in the aviation pathway. Some possible courses are below:

- **The Flying Environment**
- **UAS Operations**

**8876 Aviation IV – 1 unit**

**(CESI: ST00266)**

This is the fourth course in the aviation pathway. Some possible courses are below:

- **The Flying Environment**
- **UAS Operations**
- **Flight Planning**

**8887 Basic Electricity – (Oklahoma's Promise – Computer Credit) – 1 unit**

**(CESI: ST00281)**

Students will learn the basics of electricity and electronics. The course aligns to FAA-ACS-AM-IA-FEE Fundamentals of Electricity and Electronics.

**8718 Biomedical Health Careers – 1 unit**

**(CESI: ST00060)**

This is a course that explores occupations in the biomedical field. The occupations range from research scientist to many different medical specialties. It provides an opportunity for job shadowing and mentorship with professionals in the biomedical field.

**8702 Biotechnology I – 1 unit**

**(CESI: ST00017)**

This is a course that will familiarize the student with common laboratory glassware, utensils, and equipment. They will become skillful at using micropipettes, centrifuges, autoclaves, pH meters, and microscopes. Laboratory safety and precision/accuracy with equipment will be emphasized. The course will provide students with applicable knowledge of the scientific method, preparation and staining of microscope slides, cell structure and identification, and preparation of chemical solutions. Aseptic technique will be covered as well as preparation of culture media and specimen handling protocols. The students will also be able to maintain a pure cell culture and test for microbial sensitivity. Isolation, amplification, and characterization of DNA and proteins will be covered. Throughout the course, advanced math skills will be used for scientific notation, significant figures, conversion factors, percentages, and creating and integrating graphs for laboratory analysis and reporting.

**8703 Biotechnology II (Oklahoma's Promise - Science Credit) – 1 unit (CESI: ST00018)**

This course is an advanced continuation of Biotechnology I. It will provide the student with practice in in vitro DNA synthesis reactions, programming and use of thermal cyclers for PCR reactions, utilization of real time PCR, Southern and Western blotting techniques, protein extraction and analysis, ELISA technology, and maintenance of animal cell lines.

**8867 Computer Science Discoveries (Oklahoma's Promise – Computer Science Credit) – 1 unit (CESI: ST00256)**

Computer Science Discoveries takes a wide lens on computer science by covering topics such as programming, physical computing, HTML/CSS, and data. The course inspires students as they build their own websites, apps, games, and physical computing devices.

**8852 Computer Science Essentials (Oklahoma's Promise – Computer Science Credit) – 1 unit (CESI: ST00248)**

This course will empower students to develop computational thinking skills while building confidence that prepares them to advance to Computer Science Principles and Computer Science A.

**8860 Computer Science Principles (Oklahoma's Promise – Computer Science Credit) – 1 unit (CESI: ST00249)**

Computer Science Principles introduces students to the foundational concepts of computer science and challenges them to explore how computing and technology can impact the world. More than a traditional introduction to programming, it is a rigorous, engaging, and approachable course that explores many of the foundational ideas of computing, so all students understand how these concepts are transforming the world we live in.

**8856 Core Applications of Science & Technology – 1 unit (SREB Curriculum) (CESI: ST00244)**

This course uses the concepts learned from Course 1 to further develop students' problem-solving strategies and skills needed by the 21st-century workforce. Students will continue to explore emerging technologies and techniques in the context of addressing authentic projects. Key concepts introduced in this course include sustainability and environmental trends, systems thinking, and trend analysis and prediction. Through engagement, students will experience the necessary connection between literacy, mathematics and science in a variety of hands-on, real-world projects requiring them to apply academic and technical concepts and skills and technology to complete.

**8858 Creativity & Innovations – 1 unit (SREB Curriculum) (CESI: ST00247)**

This course will allow students to brainstorm, use invention, innovation, creativity, predictive analysis and use technology to solve real-world problems. Dimensions covered will include research and development, troubleshooting, experimentation, design failures, patents and trademarks, and design under constraints.

**8720 Crime Scene Investigation (Oklahoma's Promise – Science Credit) – 1 unit (CESI: ST00278)**

Crime Scene Investigation incorporates the diverse fields of physical and biological sciences to recreate events that surround a crime and phenomenon that are associated with these scenes. Students in this course will continue to strengthen their scientific knowledge by applying concepts that have been previously learned and utilizing the science and engineering practices to apply that knowledge to each type of evidence that is presented. This course lends itself to diverse hands-on lab activities that applies the theory that is being learned so that students get a well-rounded STEM course.

**8256 Cybersecurity Basics (Oklahoma's Promise – Computer Science Credit) – 1 unit (CESI: BT00291)**

Students will learn defense and hardening techniques used in a Windows, Cisco, and Linux environment, along with the ethical behaviors needed to be successful in industry.

**8865 Design for the Production of Advanced Products – 1 unit (SREB Curriculum) (CESI: ST00254)**

Students will create plant designs to process and automatically assemble materials into new products. Students follow the process of developing and producing a new product from prototype to final product. They will accomplish this by creating a production flow plan that allows for the mass production of the product. Students will analyze and evaluate all aspects of the design and production processes with an emphasis on clean, lean, and green production. Students will utilize data acquisition, quality control processes and Six Sigma methodology to control production.

**8149 Desktop Publishing & Graphic Design (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: BT00063)**  
Students will acquire skills related to communicating through visual design with the primary emphasis of this course being desktop publishing and working with graphics.

**8191 Digital Media Productions (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: BT00129)**  
Students will prepare for careers in digital communication as they learn to develop personal and professional videos applying appropriate certification and copyright standards.

**8888 Drone Applications (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: ST00297)**  
This course will cover thermal imaging and drone 3D modeling.

**8904 Engineering CAD and Design (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: TI00465)**  
This course is an engineering focused drafting course utilizing Computer-Aided Drafting and Design (CADD) software that develops computer skills and electronic skills and applications within engineering applications of drafting within manufacturing. Topics covered are advanced computer operations, CAD application software, and principles of structural drafting, process pipe drawings, electronic/electrical drafting, and civil drafting.

**8827 Engineering Design – 1 unit (CESI: ST00192)**  
Students will demonstrate knowledge and skills of the design process as it applies to engineering fields using multiple software applications and tools necessary to produce and present working drawings, solid model renderings, and prototypes. Students will use a variety of computer hardware and software applications to complete assignments and projects. Through implementation of the design process, students will transfer advanced academic skills to component designs. Additionally, students explore career opportunities in engineering, technology, drafting, construction, and wood working along with what is required to gain and maintain employment in these areas.

**8878 Engineering Essentials (PLTW) (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: ST00268)**  
The course introduces students to engineering concepts that are applicable across multiple engineering disciplines and empowers them to build technical skills through the use of a variety of engineering tools, such as geographic information systems (GIS), 3-D solid modeling software, and prototyping equipment. Students learn and apply the engineering design process to develop mechanical, electronic, process, and logistical solutions to relevant problems across a variety of industry sectors, including health care, public service, and product development and manufacturing.

**8905 Fundamentals of Computer Aided Drafting & Design (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: TI00365)**  
This course is the basic Computer-Aided Drafting and Design (CADD) that develops computer skills and electronic skills and applications within the field of drafting. Topics covered are safety, tools, equipment, media and reproduction, sketching, scale usage, drawing formats, alphabet of lines, lettering and geometric construction, computer literacy through CADD, operating systems and file utilities, software functions, office functions, hardware applications, coordinates, drawing environment, plotting, printing, multi-view drawing environment, geometry modifications and dimensioning, symbol library development, intro to parametric and software, intro to multiple CADD software's used to manipulate text and graphics, and basic CADD applications.

**8169 Fundamentals of Technology (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: BT00182)**  
This course will provide students with the fundamental concepts, principles, and ideas needed to understand how business is operated and managed in a rapidly changing global environment, which is needed for success in business-related careers. This course also provides job readiness skills and soft skills that are critical for success in any workplace setting.

**8153 Fundamentals of Web Design (Oklahoma’s Promise – Computer Credit) – 1 unit (CESI: BT00003)**

Students will acquire fundamental web authoring skills and design strategies through the application of XHTML incorporating Cascading Style Sheets and future trends in web programming/scripting. Once XHTML foundation skills are achieved, students will utilize a WYSIWYG editor and/or a graphics application package to produce standards-based web sites.

**8873 Google Tools (Oklahoma’s Promise – Computer Credit) – 1 unit (CESI: ST00262)**

Students will practice navigating through the general interface of Google products. The searching, organizational, communication, and collaboration components of Google products will be highlighted to help students develop a deeper understanding of how Google can enhance learning.

**8857 Impacts of Science & Technology – 1 unit (SREB Curriculum) (CESI: ST00245)**

This course will examine the past, present and future impact of science and technology on culture, society, and the environment. Students will explore how their predecessors worked to solve some problems that still exist today, and examine the potential of using modern technology to solve those problems. From these explorations, students will engage in a variety of hands-on design projects that will address tradeoffs, optimization, interconnectivity, and the nature of complex systems.

**8255 Internet of Things (IoT) Fundamentals: (Oklahoma’s Promise – Computer Science Credit) – 1 unit (CESI: BT00290)**

IoT Fundamentals curriculum provides students with a comprehensive understanding of the Internet of Things (IoT). It develops foundational skills using hands-on lab activities that stimulate the students in applying creative problem-solving and rapid prototyping in the interdisciplinary domain of electronics, networking, security, data analytics, and business. The student-centric approach translates into the student being able to ideate, design, prototype and present an IoT solution for an identified business or society need.

**8709 Introduction to Engineering Design (PLTW) (Oklahoma’s Promise – Computer Credit) – 1 unit (CESI: ST00023)**

Students dig deep into the engineering design process, applying math, science, and engineering standards to hands-on projects like designing a new toy or improving an existing product.

**8953 Introduction to Manufacturing – 1 unit (CESI: TI02044)**

This course provides a basic overview of basic manufacturing processes and career opportunities within manufacturing. Students will be introduced to the critical nature of safety in manufacturing and to the role of the individual in maintaining a safe work environment.

**8879 Mechanical Design Engineering (Oklahoma’s Promise – Computer Credit) 1 unit (CESI: ST00272)**

Students will develop an understanding of the attributes of design and the design process. Students learn the value of sustainable design with Autodesk Inventor and gain future career skills.

**8864 Mechatronic Systems for Advanced Production – 1 unit (SREB Curriculum) (CESI: ST00253)**

Students will design cost-effective work cells incorporating automation and robotics to improve quality of final products. The advanced production in this course depends on the use and coordination of information, automation, network systems, vision and sensing systems. Students will design and create mechatronic systems and automated tooling to accomplish these advanced tasks.

**8150 Multimedia & Image Management Tech – (Oklahoma’s Promise – Computer Credit) – 1 unit (CESI: BT00128)**

Students will acquire fundamental skills in image creation and management procedures and techniques as they create, revise, optimize, and export graphics for video, print, and web publishing.

**8855 Nature of Science & Technology – 1 unit (SREB Curriculum) (CESI: ST00243)**

This is a contextual-based course that introduces students to the core fundamental concepts of science and technology through authentic projects. Through these projects, students will develop an understanding of the relationship between the physical, biological and social world. Students will gain an understanding of the differences between science and technology and learn that technology is a process for applying science. Students will develop a deeper understanding of scientific inquiry and the engineering design process when solving real-world problems.

Students will experience the interaction of science, technology, engineering, math and literacy through a problem-based learning environment.

**8715 PLTW Aerospace Engineering (Oklahoma's Promise - Science Credit) – 1 unit (CESI: ST00013)**

Students explore the physics of flight and bring what they're learning to life through hands-on projects like designing a glider and creating a program for an autonomous space rover.

**8719 PLTW Biomedical Innovation (Oklahoma's Promise - Science Credit) (Capstone Credit) – 1 unit (CESI: ST00005)**

Students build on the knowledge and skills gained from previous courses to design their own innovative solutions for the most pressing health challenges of the 21st century.

**8713 PLTW Civil Engineering and Architecture – 1 unit (CESI: ST00019)**

Students learn important aspects of building and site design and development, and then they apply what they know to design a commercial building.

**8712 PLTW Computer Integrated Manufacturing (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: ST00041)**

Students discover and explore manufacturing processes, product design, robotics, and automation, and then they apply what they have learned to design solutions for real-world manufacturing problems.

**8861 PLTW Cybersecurity (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: ST00250)**

Whether seeking a career in the growing field of cybersecurity or learning to defend their own personal data or a company's data, students in Cybersecurity establish an ethical code of conduct while learning to defend data in today's complex cyberworld.

**8711 PLTW Digital Electronics (Oklahoma's Promise - Math Credit) – 1 unit (CESI: ST00021)**

Students explore the foundations of computing by engaging in circuit design processes to create combinational logic and sequential logic (memory) as electrical engineers do in industry.

**8716 PLTW Engineering Design and Development (Capstone Credit) – 1 unit (CESI: ST00022)**

Students identify a real-world challenge and then research, design, and test a solution, ultimately presenting their unique solutions to a panel of engineers.

**8878 Engineering Essentials (PLTW) – 1 unit (CESI: ST00268)**

The course introduces students to engineering concepts that are applicable across multiple engineering disciplines and empowers them to build technical skills through the use of a variety of engineering tools, such as geographic information systems (GIS), 3-D solid modeling software, and prototyping equipment. Students learn and apply the engineering design process to develop mechanical, electronic, process, and logistical solutions to relevant problems across a variety of industry sectors, including health care, public service, and product development and manufacturing.

**8854 PLTW Environmental Sustainability (Oklahoma's Promise - Science Credit) – 1 unit (CESI: ST00213)**

Students investigate and design solutions in response to real-world challenges related to clean and abundant drinking water, food supply, and renewable energy.

**8707 PLTW Human Body Systems (Oklahoma's Promise - Science Credit) – 1 unit (CESI: ST00001)**

Through projects such as determining the identity of a skeleton using both forensic anthropology and DNA analysis, students examine the interactions of human body systems and apply what they know to solve real-world medical cases.

**8709 Introduction to Engineering Design (PLTW) (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: ST00023)**

Students dig deep into the engineering design process, applying math, science, and engineering standards to hands-on projects like designing a new toy or improving an existing product.

**8708 PLTW Medical Interventions (Oklahoma's Promise - Science Credit) – 1 unit (CESI: ST00004)**

Students delve into activities like designing a prosthetic arm as they follow the life of a fictitious family and investigate how to prevent, diagnose, and treat disease.

**8706 PLTW Principles of Biomedical Science (Oklahoma's Promise - Science Credit) – 1 unit (CESI: ST00003)**

By engaging in activities like dissecting a sheep heart, students explore concepts of biology and medicine to determine factors that led to the death of a fictional person.

**8710 (PLTW) Principles of Engineering (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: ST00024)**

Students explore a broad range of engineering topics including mechanisms, strength of structure and materials, and automation, and then they apply what they know to take on challenges like designing a self-powered car.

**8871 Python (Oklahoma's Promise – Computer Science Credit) – 1 unit (CESI: ST00260)**

Python is a general-purpose programming language used to build just about anything. Python is key for backend web development, data analysis, artificial intelligence, and scientific computing.

**8884 Regulations and Ground Operations – 1 unit (CESI: ST00279)**

This course covers ground operations and servicing, as well as maintenance and inspection regulations. The course aligns to FAA-ACS-AM-IF-GOS – Ground Operations and Servicing and FAA-ACS-AM-II-MIR – Maintenance and Inspection Regulations.

**8872 Renewable Energy – 1 unit (CESI: ST00261)**

An introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternate energy sources and their technology and application.

**8833 Robotics Engineering (Oklahoma's Promise – Computer Technology Credit) – 1 unit (CESI: ST00142)**

Students will learn to design, build, program, and control robotic devices. A rigorous study and application of electrical concepts will include sources of energy, electrical safety, use and identification of basic electronic components, sensors and actuators. Engineering concepts will include: mechanical design, prototype development, design testing, programming and proper engineer documentation.

**8849 Science and Technical Visualization I – 1 unit (CESI: ST00188)**

This course focused on the principles, concepts, and use of complex graphic and visualization tools as applied to the study of science and technology. Students use complex 2D graphics, 3D Animation, editing, and image analysis tools to better understand, illustrate, explain, and present technical, mathematical, and/or scientific concepts and principles. Emphasis is placed on the use of computer-enhanced images to generate both conceptual and data-driven models, data-driven charts, and animations. Science, math, and visual design concepts are reinforced throughout each course.

**8850 Science and Technical Visualization II – 1 unit (CESI: ST00189)**

This course includes design and problem-solving concepts, visualization principles, and the application of visualization principles. Students learn about the nature of data and various tools and techniques used in different industries to retrieve, render, and display 2-D and 3-D data. Students are provided instruction in the concepts and techniques associated with rendering dynamic or changing data as animation. They are also introduced to various imaging techniques used in different industries, their implications, applications, and challenges.

**8870 Space Engineering Concepts (Oklahoma's Promise – Computer Credit) – 1 unit (CESI: ST00259)**

Space Engineering Concepts uses it to expose students to the basic principles involved with space and learn some of the academic basis of space operations. Topics include space in our lives, exploring space, space environment, understanding and describing orbits, maneuvering in space, interplanetary travel, getting to orbit, returning from space (re-entry), and rockets and launching vehicles. Students will also learn to use STK to do the following: semi-major axis, inclination, right ascension of the ascending node, argument of perigee, true anomaly, and alternative orbital elements.



**8705 STEM Capstone (Capstone Credit) – 1 unit****(CESI: ST00027)**

Internships, project-based instruction, and additional industry certifications will be utilized to reinforce skills obtained within any Science, Technology, Engineering and Math Education (STEM) state program area. Students will make final preparations for industry certifications or college as they master competencies; select from various project options to finalize portfolios that highlight skills and/or certifications; and may undertake special projects, cross-train or participate in workplace learning opportunities to enhance skills in accordance with industry demands.

**8869 STEM Core – 1 unit (Technology Center Only)****(CESI: ST00258)**

This course is an introduction to the STEM concepts that are needed to successfully complete a state program area.

**8701 Survey of Biotechnology – 1 unit****(CESI: ST00025)**

This course is designed to introduce students to areas and concepts involved in Biotechnology. Students will investigate Biotechnology processes throughout history. Students will learn about selected biotechnology approaches to solving human, environmental and agricultural problems and appreciate the impact of biotechnology on our lives and society. Students will attend field trips and seminars that will reinforce the need for biotechnology in today's workforce. They will also explore the ethics involved in and concerning biotechnology research and use.

**8863 Systems of Advanced Technology – 1 unit (SREB Curriculum)****(CESI: ST00252)**

In this course, students will apply the technologies that are found in modern clean, production environments. Students study effective and energy efficient control of pumping, conveyors, piping, pneumatic and hydraulic control systems. Students apply total quality management to production design to assure quality. Students also focus on properties of materials and material testing, creating documentation to support designs, examining properties and justifying material selections based on properties. Students learn that old products become the new raw materials for new products.

**8848 Technological Design – 1 unit****(CESI: ST00136)**

Engineering scope, content, and professional practices are presented through practical applications. Students in engineering teams apply technology, science, and mathematics concepts and skills to solve engineering design problems and innovate designs. Students research, develop, test, and analyze engineering designs using criteria such as design effectiveness, public safety, human factors, and ethics.

**8847 Technology and Society – 1 unit****(CESI: ST00187)**

Technology and Society teaches critical thinking skills as they relate to the creation and use of technology. Through the study of contemporary issues of science and technology, students are introduced to structured methods for assessing technology and science issues and developing defensible opinions and positions.

**8828 Technology Foundations – 1 unit****(CESI: ST00134)**

This course prepares students to understand and apply technologies concepts and processes that are the cornerstone for the high school technology state program area. Group and individual activities engage students in creating ideas, developing innovations, and engineering practical solutions. Technology content, resources, and laboratory-classroom activities apply student applications of science, mathematics, and other school subjects in authentic situations.

**8881 Virtual Reality (VR) Coding (Oklahoma's Promise – Computer Credit) – 1 unit****(CESI: ST00274)**

This course will introduce you to Virtual Reality (VR). The course will teach you everything from the basics of VR- the hardware and the history of VR- to different applications of VR, the psychology of Virtual Reality, and the challenges of the medium.

**STEM Pathways**

Pathway Code	Pathway
SC001	<b>Engineering and Technology</b>
SC002	<b>Science and Mathematics</b>

**Science, Technology, Engineering, Mathematics  
Grades 9 – 12**

OCAS	Course	CESI	Oklahoma's Promise
8149	Desktop Publishing and Graphic Design	BT00063	Computer
8150	Multimedia & Image Management Techniques	BT00128	Computer
8153	Fundamentals of Web Design	BT00003	Computer
8160	Advanced Programming	BT00016	Computer Science
8169	Fundamentals of Technology	BT00182	Computer
8191	Digital Media Production	BT00129	Computer
8255	Internet of Things (IoT) Fundamentals	BT00290	Computer Science
8256	Cybersecurity Basics	BT00291	Computer Science
8701	Survey of Biotechnology	ST00025	
8702	Biotechnology I	ST00017	
8703	Biotechnology II	ST00018	Science
8704	Advanced Biotechnology I	ST00026	
8705	STEM Capstone (Capstone Credit)	ST00027	
8706	PLTW Principles of Biomedical Science	ST00003	Science
8707	PLTW Human Body Systems	ST00001	Science
8708	PLTW Medical Interventions	ST00004	Science
8709	Intro to Engineering Design	ST00023	Computer
8710	Principles of Engineering	ST00024	Computer
8711	PLTW Digital Electronics	ST00021	Math
8712	PLTW Computer Integrated Manufacturing	ST00041	Computer
8713	PLTW Civil Engineering and Architecture	ST00019	
8715	PLTW Aerospace Engineering	ST00013	Science
8716	PLTW Engineering Design and Development (Capstone Credit)	ST00022	
8717	Advanced Biotechnology II	ST00040	Science
8718	Biomedical Health Careers	ST00060	
8719	PLTW Biomedical Innovation (Capstone Credit)	ST00005	Science
8720	Crime Scene Investigation	ST00278	Science
8825	Advanced Technological Applications	ST00191	
8826	Advanced Design Applications	ST00125	
8827	Engineering Design	ST00192	
8828	Technology Foundations	ST00134	
8833	Robotics Engineering	ST00142	Computer
8847	Technology and Society	ST00187	
8848	Technological Design	ST00136	
8849	Science and Technical Visualization I	ST00188	
8850	Science and Technical Visualization II	ST00189	
8851	AP Computer Science Principles	ST00200	Computer Science
8852	Computer Science Essentials	ST00248	Computer Science
8853	AP Computer Science A (CSA)	ST00208	Computer Science
8854	PLTW Environmental Sustainability	ST00213	Science
8855	Nature of Science & Technology (SREB)	ST00243	
8856	Core Applications of Science & Technology (SREB)	ST00244	
8857	Impacts of Science & Technology (SREB)	ST00245	
8858	Creativity & Innovations (SREB)	ST00247	
8859	Aerospace I	ST00246	
8860	Computer Science Principles	ST00249	Computer Science
8861	PLTW Cybersecurity	ST00250	Computer
8862	Advanced Technology for Design Production (SREB)	ST00251	
8863	Systems of Advanced Technology (SREB)	ST00252	
8864	Mechatronic Systems for Advanced Production (SREB)	ST00253	
8865	Design for the Production of Advanced Products (SREB)	ST00254	
8866	Advanced Robotics Engineering	ST00255	Computer
8867	Computer Science Discoveries	ST00256	Computer Science
8868	Aeroponics/Hydroponics/Aquaponics	ST00257	
8869	STEM Core	ST00258	
8870	Space Engineering Concepts	ST00259	Computer
8871	Python	ST00260	Computer Science

**Science, Technology, Engineering and Math Core Courses  
Grade 9 – 12**

OCAS	Course	CESI	Oklahoma's Promise
8872	Renewable Energy	ST00261	
8873	Google Tools	ST00262	Computer
8874	Aviation I	ST00263	
8875	Aviation II	ST00264	Computer
8876	Aviation III – Pilot	ST00265	Computer
8876	Aviation III – UAS	ST00267	Computer
8877	Aviation IV	ST00266	
8878	Engineering Essentials	ST00268	Computer
8879	Mechanical Design Engineering	ST00272	Computer
8880	Architecture Design	ST00273	Computer
8881	Virtual Reality (VR) Coding	ST00274	Computer
8882	Advanced Mechanical Design Engineering	ST00275	Computer
8883	Aerospace Capstone	ST00284	Capstone
8884	Regulations and Ground Operations	ST00279	
8885	Aircraft Material and Corrosions Control	ST00280	
8886	Applied Science of Aircraft Maintenance	ST00282	Computer
8887	Basic Electricity	ST00281	Computer
8888	Drone Applications	ST00297	Computer
8903	Architecture Computer Aided Drafting and Design	T100880	Computer
8904	Engineering Computer Aided Drafting and Design	T100465	Computer
8905	Fundamentals of Computer Aided Drafting and Design	T100365	Computer
8953	Introduction to Manufacturing	T102044	
4412	Algebra II	ST00006	Math
4413	Algebra III	ST00269	Math
4520	Geometry	ST00009	Math
4611	Pre-Calculus (120 hours)	ST00010	Math
4611	Pre-Calculus (60 hours)	ST00224	Math
4612	Calculus	ST00059	Math
4614	AP Pre-Calculus	ST00300	Math
4615	AP Calculus AB	ST00061	Math
4616	AP Calculus BC	ST00062	Math
4740	Statistics and Probability	ST00270	Math
4750	Trigonometry	ST00223	Math
4760	AP Statistics	ST00029	Math
4830	Advanced Studies in Math I	ST00290	
4831	Advanced Studies in Math II	ST00291	
5035	AP Biology	ST00028	Science
5051	Chemistry I	ST00016	Science
5055	AP Chemistry	ST00007	Science
5121	AP Environmental Science	ST00002	Science
5211	Physics I	ST00011	Science
5212	Physics II	ST00271	Science
5213	AP Physics 1: Algebra-Based	ST00206	Science
5214	AP Physics 2: Algebra-Based	ST00207	Science
5216	AP Physics C: Mechanics	ST00064	Science
5217	AP Physics C: Electricity & Magnetism	ST00065	Science
5333	Physiology (60 hours)	HL00598	Science
5333	Physiology (120 hours)	ST00298	Science
5333	Anatomy (60 hours)	HL00597	Science
5333	Anatomy (120 hours)	ST00299	Science
5336	Microbiology	ST00015	Science

**CareerTech Certifications by Course**

<https://www.okcareertech.org/educators/certifications/forms-and-resources>

**Oklahoma Promise Approved Courses:**

<https://secure.okcollegestart.org/College Planning/Prepare for College/course guidelines.aspx>

# Middle School Courses

CESI Pathway: SC000 Science, Technology, Engineering and Mathematics Exploratory

## **8971 Architecture & Construction Exploration** – ¼ to 1 unit (CESI: ST00292)

Exploring *Careers* in designing, planning, managing, building and maintaining the built environment.

## **8971 Green Architecture (Gateway)** – ¼ to 1 unit (CESI: ST00139)

In this course, students learn how to apply green concepts to the fields of architecture and construction. They explore dimensioning, measuring, and architectural sustainability and apply what they have learned to design affordable housing units using 3D architectural design software. This course is designed for 6<sup>th</sup> – 8<sup>th</sup> grade students.

## **8972 Arts, A/V Technology & Communications Exploration** – ¼ to 1 unit (CESI: 00293)

## **8830 Engineering Exploration** – ¼ to 1 unit (CESI: ST00289)

Exploring a future in the Engineering and Technology pathway, students should study and apply principles from advanced mathematics life sciences physical science, earth and space science, and technology.

## **8830 Automation and Robotics Exploration (Gateway)** – ¼ to 1 unit (CESI: ST00088)

Students learn about the history and impact of automation and robotics as they explore mechanical systems, energy transfer, machine automation, and computer control systems. Using the VEX Robotics® platform, students apply what they know to design and program a variety of objects.

## **8830 Design and Modeling Exploration (Gateway)** – ¼ to 1 unit (CESI: ST00085)

Students discover the design process and develop an understanding of the influence of creativity and innovation in their lives. They are then challenged and empowered to use and apply what they've learned throughout the course to design unique products.

## **8830 Gateway Exploration** – ¼ to 1 unit (CESI: ST00276)

Students experience different units in different Gateway courses during the course.

## **8830 Magic of Electrons Exploration (Gateway)** – ¼ to 1 unit (CESI: ST00086)

Students examine the behavior and parts of atoms as well as the impact of electricity on the world around them. They learn skills in basic circuitry design and use what they know to propose designs such as an alarm system.

## **8830 STEM Career Exploration** – ¼ to 1 unit (CESI: ST00288)

Students will research different STEM careers through hands on activities and projects.

## **8830 Tech Engineering Exploration I** – ¼ to 1 unit (CESI: ST00230 (Year), ST00229 (Semester), ST00228 (9 Week))

## **8830 Tech Engineering Exploration II** – ¼ to 1 unit (CESI: ST00236 (Year), ST00235 (Semester), ST00234 (9 Week))

## **8830 Tech Engineering Exploration III** – ¼ to 1 unit (CESI: ST00242 (Year), ST00241 (Semester), ST00240 (9 Week))

## **8835 Health Science Exploration** - ¼ to 1 unit (CESI: ST00286)

Exploring planning, managing, and providing therapeutic services, diagnostic services, health informatics, support services, and biotechnology research and development.

## **8835 Medical Detectives Exploration (Gateway)** – ¼ to 1 unit (CESI: ST00090)

Students play the role of real-life medical detectives as they collect and analyze medical data to diagnose disease. They solve medical mysteries through hands-on projects and labs, measure and interpret vital signs, examine nervous system structure and function, and investigate disease outbreaks.

**8838 Information Technology Exploration** ¼ to 1 unit (CESI: ST00287)

Explore building linkages in IT occupations for entry level, technical and professional careers related to the design, development, support and management of hardware, software, multimedia and systems integration services.

**8838 App Creators Exploration (Gateway)** – ¼ to 1 unit (CESI: ST00091)

This course will expose students to computer science as a means of computationally analyzing and developing solutions to authentic problems through mobile app development and will convey the positive impact of the application of computer science to other disciplines and to society.

**8838 Computer Science for Innovators and Makers Exploration (Gateway)** – ¼ to 1 unit (CESI: ST00095)

Throughout the course, students will learn about programming for the physical world by blending hardware design and software development, allowing students to discover computer science concepts and skills by creating personally relevant, tangible, and shareable projects.

**8838 Computer Science Exploration – 1 Unit** (CESI: ST00096)

The course teaches the foundational concepts of programming using drag and drop blocks rather than a programming language such as JavaScript or Python. Blocks are an easier way to get started and many top Universities today begin their classes with block-based programming.

**8838 Science of Technology Exploration (Gateway)** – ¼ to 1 unit (CESI: ST00087)

Science impacts the technology of yesterday, today, and the future. In this unit, students apply the concepts of physics, chemistry, and nanotechnology to relevant, tangible activities and projects.

**8977 Manufacturing Exploration** – ¼ to 1 unit (CESI: ST00295)

Explore the planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance and manufacturing/process engineering.

**8976 Natural Resources Exploration** – ¼ to 1 unit (CESI: ST00294)

Explore work in the Natural Resources Systems pathway perform a variety of tasks from helping to develop, maintain, and manage the forest and natural environment.

**8976 Energy and the Environment Exploration (Gateway)** – ¼ to 1 unit (CESI: ST00138)

Students are challenged to think big and toward the future as they explore sustainable solutions to our energy needs and investigate the impact of energy on our lives and the world. They use what they've learned to design and model alternative energy sources, as well as evaluate options for reducing energy consumption.

**8976 Renewable Energy Exploration** – ¼ to 1 unit (CESI: ST00277)

An introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternate energy sources and their technology and application.

**8978 Transportation Exploration** – ¼ to 1 unit (CESI: ST0000296)

Explore the planning, management, and movement of people, materials, and goods by road, pipeline, air, rail and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment and facility maintenance.

**8978 Flight and Space Exploration (Gateway)** – ¼ to 1 unit (CESI: ST00089)

The exciting world of aerospace comes alive through Flight and Space. Students explore the science behind aeronautics and use their knowledge to design, build, and test multiple flying apparatuses.

**CESI Pathway: SC000 Science, Technology, Engineering and Mathematics Exploratory**

Science, Technology, Engineering and Math Courses Grade 6 – 8		Pathway: SC000 STEM Exploratory
OCAS	Course Titles	CESI Course Codes
8830	Engineering Exploration	ST00289 or Choose One Below
8830	Automation and Robotics (Gateway)	ST00088
8830	Design and Modeling (Gateway)	ST00085
8830	Gateway Exploration	ST00276
8830	Magic of Electrons (Gateway)	ST00086
8830	STEM Career Exploration	ST00288
8830	Tech Engineering Exploration I	ST00230 (Year), ST00229 (Semester), ST00228 (9 Week)
8830	Tech Engineering Exploration II	ST00236 (Year), ST00235 (Semester), ST00234 (9 Week)
8830	Tech Engineering Exploration III	ST00242 (Year), ST00241 (Semester), ST00240 (9 Week)
8835	Health Science Exploration	ST00286 Choose one below
8835	Medical Detectives Ex. (Gateway)	ST00090
8835	Tech Engineering Exploration I	ST00230 (Year), ST00229 (Semester), ST00228 (9 Week)
8835	Tech Engineering Exploration II	ST00236 (Year), ST00235 (Semester), ST00234 (9 Week)
8835	Tech Engineering Exploration III	ST00242 (Year), ST00241 (Semester), ST00240 (9 Week)
8838	Information Technology Exploration	ST00287 or Choose One Below
8838	App Creator Ex. (Gateway)	ST00091
8838	CS for Inn. & Makers Ex (Gateway)	ST00095
8838	Computer Science Exploration	ST00096
8838	Science of Technology Ex. (Gateway)	ST00087
8867	Computer Science Discoveries (Middle/High School)	ST00256
8874	Aviation I	ST00263
8971	Architecture & Construction Exploration	ST00292 or choose one below:
8971	Green Architecture Ex. (Gateway)	ST00139
8971	Tech Engineering Exploration I	ST00230 (Year), ST00229 (Semester), ST00228 (9 Week)
8971	Tech Engineering Exploration II	ST00236 (Year), ST00235 (Semester), ST00234 (9 Week)
8971	Tech Engineering Exploration III	ST00242 (Year), ST00241 (Semester), ST00240 (9 Week)
8972	Arts, A/V Technology & Communication Exploration	ST00293 or choose one below:
8972	Tech Engineering Exploration I	ST00230 (Year), ST00229 (Semester), ST00228 (9 Week)
8972	Tech Engineering Exploration II	ST00236 (Year), ST00235 (Semester), ST00234 (9 Week)
8972	Tech Engineering Exploration III	ST00242 (Year), ST00241 (Semester), ST00240 (9 Week)
8874	Google Tools (Middle/High School)	ST00262
8976	Natural Resources Exploration	ST00294 or choose one below:
8976	Energy and the Environment Exploration (Gateway)	ST00138
8976	Renewable Energy Exploration	ST00277
8976	Tech Engineering Exploration I	ST00230 (Year), ST00229 (Semester), ST00228 (9 Week)
8976	Tech Engineering Exploration II	ST00236 (Year), ST00235 (Semester), ST00234 (9 Week)
8976	Tech Engineering Exploration III	ST00242 (Year), ST00241 (Semester), ST00240 (9 Week)
8977	Manufacturing Exploration	ST00295 or choose one below:
8977	Tech Engineering Exploration I	ST00230 (Year), ST00229 (Semester), ST00228 (9 Week)
8977	Tech Engineering Exploration II	ST00236 (Year), ST00235 (Semester), ST00234 (9 Week)
8977	Tech Engineering Exploration III	ST00242 (Year), ST00241 (Semester), ST00240 (9 Week)
8978	Transportation Exploration	ST00296 or choose one below:
8978	Flight and Space (Gateway)	ST00089
8978	Tech Engineering Exploration I	ST00230 (Year), ST00229 (Semester), ST00228 (9 Week)
8978	Tech Engineering Exploration II	ST00236 (Year), ST00235 (Semester), ST00234 (9 Week)
8978	Tech Engineering Exploration III	ST00242 (Year), ST00241 (Semester), ST00240 (9 Week)