

www.vcsu.edu - catalog.vcsu.edu - 101 College St SW, Valley City, ND 58072 - 800-532-8641 - 701-845-7202

Technology (TECH)

Courses

TECH 161. Technology, Engineering, and Design. 4 Credits.

An introductory course that examines the engineering design process and its use to solve technological challenges. The course will cover the nature of technology, technology systems, and the history, evolution, and characteristics of technology, as well as learning activities to apply technology, science, and mathematics concepts.

Typically Offered: Fall, Spring.

TECH 165. Technology Solutions for Society. 4 Credits.

An introductory course that examines the impacts of technology and society. This course will cover concepts related to heat transfer, crop production, material properties, structural forces, and energy conservation. Working through the Engineering Design Process students will research societal problems, gather data, propose design ideas, and build practical solutions.

Typically Offered: Spring.

TECH 199. Special Topics. 1-4 Credits.

Courses not offered in the regular catalog that provide an opportunity to extend student learning. **Typically Offered:** On sufficient demand. **Repeatable:** Up to 12 Credits.

TECH 299. Special Topics. 1-4 Credits.

Courses not offered in the regular catalog that provide an opportunity to extend student learning. **Typically Offered:** On sufficient demand. **Repeatable:** Up to 12 Credits.

TECH 300. 3D Modeling and Design. 3 Credits.

An introduction to the principles of graphic design and 3D parametric modeling in the creation and visualization of engineering designs and drawings. Students will be able to illustrate parametric 3D part modeling, assembly, rendering, and production of working drawings from design ideas. The course includes a lab component.

Typically Offered: Fall.

TECH 325. Technology and Engineering I. 3 Credits.

This course is designed to provide technology education and STEM content expertise through examination of a myriad of ITEEAs Engineering by Design (EbD) curricular challenges. Students will use Middle and High School authentic Problem-Project Based Learning (PBL) content and lab-based activities to complete engineering design challenges selected from EbD Courses Exploring Technology, Invention and Innovation, Technological Systems, Foundations of Technology and Engineering, and Technological Design. All units of study will promote the design process, critical thinking and problemsolving through completion of embedded lab activities that support learning content and the application thereof. **Typically Offered:** Fall.

TECH 330. Technology and Engineering II. 3 Credits.

This course is designed to provide technology education and STEM content expertise through examination of a myriad of PLTWs curricular challenges. Students will use Activity and Problem Based Learning (APBL) content and lab-based activities to complete engineering design challenges selected from PLTW Gateway Units Design and Modeling, Magic of Electrons, Automation and Robotics, and Flight and Space. All units of study will promote the design process, critical thinking and problem-solving through completion of embedded lab activities that support learning content and the application thereof.

Typically Offered: Spring.

TECH 356. Safety and Management in Technology Education. 3 Credits.

An examination of safety in Technology/STEM and Career and Technical Education (CTE) workspaces including makerspaces, fab labs, STEM labs, and traditional shop settings. This course covers essential understandings related to legal responsibilities, controls for safety, machine safety, as well as hazard mapping and mitigation of the workspace(s) students operate within. By completing all elements of this course prospective teachers will understand the value of a well-documented Technology/STEM and Career and Technical Education (CTE) safety program that both supports student awareness and protects teachers from tort liability. **Typically Offered:** Spring.

TECH 371. Technology Systems. 3 Credits.

A focus on content and processes associated with technological systems. Students apply systems thinking, reverse engineering, and other related concepts in projects to better understand systems design, maintenance, and troubleshooting. The course includes a lab component. **Typically Offered:** Spring. www.vcsu.edu - catalog.vcsu.edu - 101 College St SW, Valley City, ND 58072 - 800-532-8641 - 701-845-7202

TECH 391. Foundations of Technology. 3 Credits.

An exploration of the foundations of technology using the design process. Students learn to innovate and engineer practical solutions. The course includes a lab component. Typically Offered: Spring.

TECH 394. Independent Study. 1-3 Credits.

Directed reading, study, and/or activities in selected topics. Typically Offered: On sufficient demand. Repeatable: Up to 12 Credits.

TECH 399. Special Topics. 1-4 Credits.

Courses not offered in the regular catalog that provide an opportunity to extend student learning. Typically Offered: On sufficient demand. Repeatable: Up to 12 Credits.

TECH 416. Innovations in Energy and Power Technologies. **3 Credits.**

A foundation of key concepts in energy, power, and electronics. Students develop an understanding of the science of energy and its application in technology; power plant technologies: sustainability; life cycle assessment; and analog and digital circuitry. This course includes embedded lab activities to support learning content and the application thereof.

Typically Offered: Fall.

TECH 421. Computer Science, Programming, and Robotics. **3 Credits.**

An introduction to basic computer systems, programming, and logic. Students will learn about computer hardware and general digital functionality of major system components. Students will learn how software used to program computer systems can create new functionality within the same system or additional system components. Students will use new knowledge and understanding to read and create basic coding operations to complete a task or solve a problem in a robotic setting. This course includes embedded lab activities to support learning content and the application thereof. Typically Offered: Spring.

TECH 456. Intelligent Machines. 3 Credits.

A focus on the structure and integration of artificial intelligence (AI) concepts and components to create an AI system and machine. Students will be required to build varied technological devices that contribute to creating artificial intelligence and machine learning. Through use of electronics, microcontrollers, sensors, and coding students will gain an understanding of digital and analog controls embedded in Al systems and machines. This course includes embedded lab activities to support learning content and the application thereof.

Typically Offered: Fall.

TECH 478. Technology, Society, and Sustainability. 3 Credits.

This course is designed to provide the student with conceptual knowledge and know-how to better assess the impact of technology on society and the environment. It will familiarize students with environmentally friendly consumer products that may lead to a more sustainable future. This course includes embedded lab activities to support learning content and the application thereof. Typically Offered: Fall.

TECH 491. Senior Portfolio. 1 Credit.

A course to assist the student in developing the digital portfolio used to assess the completion of the program outcomes. The course addresses both technical application and content and allows the student to demonstrate program outcome competencies.

Typically Offered: Fall, Spring, Summer. Grading: S/U only.

TECH 497. Internship. 3-12 Credits.

An opportunity for students to apply classroom learning to an on-the-job work experience. Internship must be related to the student's major or minor course of study and may be in any geographic location. Credit is granted in the range of three to twelve hours per semester and may be repeated up to a maximum of 12 credit hours. Application and approval through Career Services.

Typically Offered: Fall, Spring, Summer.

Prerequisites: Junior Standing or Senior Standing and cum GPA of 2.50 or higher.

Grading: S/U only.

Repeatable: Up to 12 Credits.

TECH 499. Special Topics. 1-4 Credits.

Courses not offered in the regular catalog that provide an opportunity to extend student learning. Typically Offered: On sufficient demand. Repeatable: Up to 12 Credits.