NEBRASKA CAREER AND TECHNICAL EDUCATION

CTE®
Learning that works
for Nebraska

NEBRASKA DEPARTMENT OF EDUCATION

COMMUNICATION AND INFORMATION SYSTEMS
PROGRAM OF STUDY STANDARDS

COMMUNICATION ARTS

INFORMATION TECHNOLOGY

NEBRASKA CAREER AND TECHNICAL EDUCATION STATE MODEL PROGRAMS OF STUDY

CAREER FIELD OVERVIEW

The Communication and Information Systems Career Field Area provides opportunities for students to deepen their understanding of topics in areas such as computer science, information technology, e-commerce, advertising, public relations, commercial photography, journalism, graphic design, broadcasting, scriptwriting, radio/TV production, business technology applications, web design, interactive media, and networking.

PROGRAMS OF STUDY

Programs of Study are the primary delivery model for Career and Technical Education (CTE) in Nebraska. They include a sequence of courses which progresses in specificity and rigor and are updated regularly to align with Nebraska's workforce needs and economic development priorities. This document includes the programs of study and course-based standards for the Communication and Information Systems career field. These state model programs of study were developed to:

- Assist secondary schools in creating meaningful sequences of courses that adequately prepare individuals for seamless transitions to postsecondary education and careers eliminating duplication of coursework;

- Assist students in identifying appropriate courses for high school and postsecondary education that lead to their chosen career;

- Encourage collaboration between secondary and postsecondary education through curricular alignment;

- Offer opportunities for high-quality workplace experiences aligned to students' career interests;

- Promote the advancement of early postsecondary opportunities (including dual-credit courses) for all students; and

- Support postsecondary education options for students to further prepare them for successful transitions to their future careers.

Nebraska's programs of study are organized around Nebraska's CTE Model, which provides a way for students to explore the diversity of career options available to them.

NEBRASKA CAREER AND TECHNICAL EDUCATION MODEL

① CORE ACADEMICS AND CAREER READINESS

At the center of the NCE Model is the expectation for all students to develop a solid academic core. The next ring identifies specific career readiness standards and practices that prepare students for success in postsecondary education as well as entrepreneurship/employment.

② CAREER FIELDS

The six career fields represent broad sectors of the job market on which students may choose to focus.

③ CAREER CLUSTERS

Each career field is composed of career clusters radiating out from it. The clusters are more specific segments of the labor market. Each cluster is a grouping of careers that focus on similar subjects or similar skills. A basic understanding and exploration of each of the clusters will provide students with a solid foundation for career decision-making to conceptualize the entire world of work.

④ EMPLOYABILITY AND ENTREPRENEURSHIP

Career education provides the opportunity to gain the knowledge and skills for both employment and entrepreneurship. The reality for Nebraska and the United States is that entrepreneurship will help ensure economic growth and vitality. By infusing entrepreneurship competencies, career education is helping create the next generation of America's innovators and entrepreneurs.

The model is a visual map of "career fields" and "career clusters/pathways" and organizes the 16 National Career Clusters into six broad sectors of entrepreneurship and employment:

- Agriculture, Food and Natural Resources
- Business, Marketing and Management
- Communication and Information Systems
- Health Sciences
- Human Sciences and Education
- Skilled and Technical Sciences

These fields break down into more specific Career Clusters, Pathways and Occupational Specialties. The model provides a way for:

- Students to explore the diversity of career options available to them.
- Students to begin to prepare for their career with plans for secondary and post-secondary education.
- Schools to organize curriculum into Programs of Study that prepare students for opportunities in Nebraska's economy.

COURSE SEQUENCING
The courses within the State Model Program of Study are intended to be offered sequentially, to allow learners to build upon foundational knowledge and skills learned in introductory and intermediate courses and applied in more advanced capstone coursework. Non-duplicative sequences of courses ensure students transition to postsecondary education without duplication of classes and content. CTE enrollment data is collected at the course level. Students who participate and concentrate in CTE generally have more positive outcomes such as higher graduation rates along with postsecondary success.

Introductory Courses
Introductory courses set the foundation for a program of study by introducing students to broad foundational knowledge relative to an occupational area and career field.

Intermediate Courses
Intermediate courses build on the foundational knowledge of Introductory courses to further develop the academic, technical, and career readiness skills within a particular career field and occupational area.

Capstone Courses
Capstone courses are occupationally specific and further develop the necessary and required academic, technical, and career readiness skills needed for seamless transitions to postsecondary education and employment. Capstone courses often provide opportunities for students to earn postsecondary credit.

Levels of Participation

CTE Participant

A student who has earned one or more credits in any career and technical education program area.

CTE Concentrator

A secondary student who, in grades 9 through 12, has earned credit in at least two courses in a single career cluster program at the intermediate or capstone level.

State Model Programs of Study are coordinated, nonduplicative sequences of academic and technical content at the secondary and postsecondary levels that incorporate challenging State academic standards, address both academic and technical knowledge and skills, including Nebraska's Career Readiness Skills, are aligned with the needs of industries in Nebraska's economy, progress in specificity, have multiple entry and exit points that incorporate credentialing, and culminate in the attainment of a recognized postsecondary credential.

COURSE-BASED STANDARDS

Individual CTE courses, which make up the sequence of courses for Programs of Study, include content area standards and indicators to provide a framework for quality teaching and learning. While not required by state law, districts are encouraged to adopt these State Model Programs of Study and their related course-based standards. CTE State Model Programs of Study and course-based standards are revised on a five-year cycle to remain responsive to the rapid advances and needs of business and industry, help students explore a variety of postsecondary options and corresponding entrance requirements to help identify their next steps, and to align to changes in postsecondary programs.

Standards

At the highest level of generality, content area standards include a set of broad, overarching content-based statements that describe the basic cognitive, affective, or psychomotor expectations of students. They reflect long-term goals for learning.

Indicators

Under each standard are indicators, which further describe what a student must know and be able to do to meet the standard. Indicators are performance-based statements that provide educators with a clear understanding of the expected level of student learning and guidance. Indicators provide guidance for an assessment of student learning.

EXPANDED LEARNING OPPORTUNITIES

Expanded learning opportunities build on, support, and enhance learning within and outside of regular school programming. They are a critical component of Nebraska's educational landscape and should be intentionally supported to further develop students' college and career readiness. To signal aligned expanded learning opportunities, each Program of Study identifies additional areas where students may desire to personalize their program and take additional coursework or work-based learning that aligns with their interests. These expanded learning opportunities are not considered part of a Program of Study nor are they required, but rather a meaningful opportunity for students to continue to learn after completing the Program of Study sequence of courses within the context of their career interests. Along with aligned coursework, two prominent expanded learning opportunities include participating in Work-Based Learning or a Career and Technical Student Organization.

Work-Based Learning

Work-Based Learning (WBL) connects learners with employers to prepare them for success in an ever-changing workplace. WBL is a planned program of meaningful experiences related to the career interests of learners that enables them to acquire knowledge and skills in a real or simulated work setting. It requires strong partnerships between schools, colleges, and local employers. WBL is learning through work, not simply learning about work. Expanding high-quality WBL opportunities for students is one of Nebraska's CTE strategic priorities and is a program quality accountability indicator. Nebraska CTE affirms WBL as a critical component of career development. Throughout the State Model Programs of Study, courses where WBL is embedded into the class is noted in the course title (e.g., "Information Technology Work-Based Learning Experience"). It is also signaled as an expanded learning opportunity across all programs of study.

Career And Technical Student Organizations

Career and Technical Student Organizations (CTSOs) are an extension of classroom instruction—applying classroom learning to real-world experiences. CTSOs provide opportunities for all students to develop career readiness skills through activities, competitions, and community service. Nebraska recognizes seven CTSOs aligned with the state's Programs of Study and career field areas. These include:

COMMUNICATION AND INFORMATION SYSTEMS

AGRICULTURE, FOOD, AND NATURAL RESOURCES

BUSINESS, MARKETING, AND MANAGEMENT

HEALTH SCIENCES

HUMAN SCIENCES AND EDUCATION

SKILLED AND TECHNICAL SCIENCES
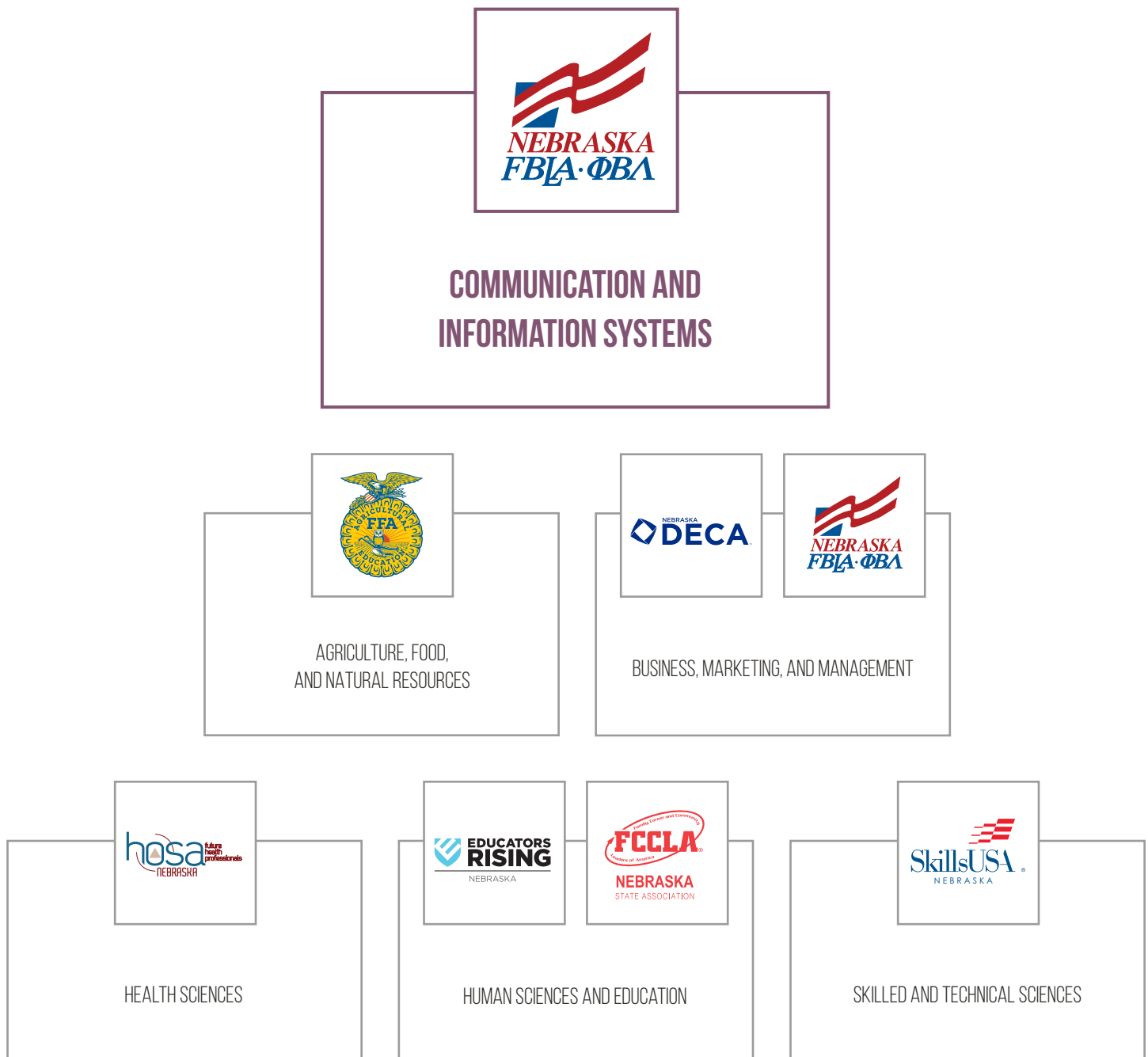
CAREER READINESS STANDARDS

Embedded into the State Model Programs of Study and courses are the Nebraska Career Readiness standards. These standards rest on important "practices and proficiencies" with long-standing importance in career education. These standards and related practices are not limited to formal CTE programs nor to the middle school or high school level. Rather, these standards and practices should be used over and over again with increasing complexity and relevance by students as they progress through their educational pathway. The standards themselves do not dictate curriculum, pedagogy or delivery of content. Schools and colleges may handle the teaching and assessing of these standards in many different ways.

THE CAREER READY INDIVIDUAL...

1. Applies appropriate academic and technical skills

2. Communicates effectively and appropriately

3. Contributes to employer and community success

4. Makes sense of problems and perseveres in solving them

5. Uses critical thinking

6. Demonstrates innovation and creativity

7. Models ethical leadership and effective management

8. Works productively in teams and demonstrates cultural competency

9. Utilizes technology

10. Manages personal career development

11. Attends to personal and financial well-being

COMMUNICATION ARTS
CLUSTER

Program of Study Name	Introductory Course	Intermediate Course	Capstone Course	Expanded Learning Opportunity
BROADCAST JOURNALISM (Page10–24)	270602 - Digital Media	270609 - Video Production	270610 - Media Production, OR 270604 - Foundations of Web Design	320704 - Communication Arts Work-Based Learning Experience
DIGITAL DESIGN (Page 25–38)	270602 - Digital Media	270611 - Digital Design	270613 - Advanced Digital Design, OR 270604 - Foundations of Web Design	320704 - Communication Arts Work-Based Learning Experience

INFORMATION TECHNOLOGY
CLUSTER

Program of Study Name	Introductory Course	Intermediate Course	Capstone Course	Expanded Learning Opportunity
BUSINESS TECHNOLOGY (Page 39–53)	270501 - IT Applications 1, AND 270502 - IT Applications 2	270611 - Digital Design	270604 - Foundations of Web Design, OR 030600 - Business Communication (BMM)	320713 - Information Technology Work-Based Learning Experience, OR 320704 - Communication Arts Work-Based Learning Experience
CISCO NETWORKING	270505 - CISCO I: Introduction to Networks	270506 - CISCO II: Routing & Switching Essentials	270507 - CISCO III: Scaling Networks	320713 - Information Technology Work-Based Learning Experience
COMPUTER SCIENCE (Page 54–69)	270704 - Foundations of Computing, OR 270504 - IT Fundamentals	270703 - Computer Science Principles, OR 270702 - AP Computer Science Principles, OR 270708 - PLTW Computer Science Principles	270701 - Computer Science A, OR 270712 - IB Comp Science, OR 270700 - AP Computer Science A, OR 270705 - Software Development, OR 270709 - PLTW Computer Science A	320713 - Information Technology Work-Based Learning Experience

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | PROGRAMS OF STUDY

INFORMATION TECHNOLOGY
CLUSTER **(CONTINUED)**

Program of Study Name	Introductory Course	Intermediate Course	Capstone Course	Expanded Learning Opportunity
DATA ANALYTICS AND MANAGEMENT (Page 70–78)	270502 - IT Applications 2	Data Literacy & Visualization	Introduction to Data Science	320713 - Information Technology Work-Based Learning Experience
IT OPERATIONS MANAGEMENT (Page 79–92)	270504 - IT Fundamentals, OR 270502 - IT Applications 2	270707 - Cybersecurity, OR 270711 - PLTW Cybersecurity	270601 - Networking	320713 - Information Technology Work-Based Learning Experience
WEB DEVELOPMENT (Page 93–105)	270504 - IT Fundamentals, OR 270502 - IT Applications 2	270706 - Web Design & Development	270604 - Foundations of Web Design	320713 - Information Technology Work-Based Learning Experience, OR 320704 - Communication Arts Work-Based Learning Experience

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | PROGRAMS OF STUDY

DIGITAL MEDIA

COURSE DESCRIPTION

Students will learn and apply copyright laws while using industry standard digital tools to create, design, and produce digital media including sound, video, motion graphics, and print design following rules of composition and basic design principles.

STANDARDS AND INDICATORS:

CIS.HS.7.1   Evaluate and comply with copyright laws.

CIS.HS.7.1.a   Define terms such as infringement and fair use, royalty free and copyright free, and public domain.

CIS.HS.7.1.b   Locate sources of royalty-free music, images, graphics, and video.

CIS.HS.7.1c   Define copyright as it applies to their own creative work.

CIS.HS.7.1.d   Select audio, video, still images, and art that are royalty free and/or abide by the licensing agreement under Creative Commons usage.

CIS.HS.7.1.e   Analyze the different types of copyright licenses and their uses. (e.g., Creative Commons, Public Domain…)

CIS.HS.7.2   Demonstrate composition techniques.

CIS.HS.7.2.a   Demonstrate rules of composition (e.g., rule of thirds, point-of-view, framing).

CIS.HS.7.2.b   Demonstrate a variety of photographic/video shots using a digital camera or video camera (e.g., establishing, close up, mid-shot, wide, over the shoulder).

CIS.HS.7.2.c   Demonstrate elements of typographic design in print media (e.g., font selection, size, leading, tracking and kerning, measure, whitespace, hierarchy, and scale).

CIS.HS.7.2.d   Demonstrate basic design principles such as consistency, dominance, palette, eye line, readability, alignment, and color theory.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | DIGITAL MEDIA

DIGITAL MEDIA (cont.)

CIS.HS.7.3   **Create and edit digital photographic images.**

CIS.HS.7.3.a   Select appropriate hardware and software.

CIS.HS.7.3.b   Capture still photographic images.

CIS.HS.7.3.c   Edit still photos (e.g., cropping, color correction, layers, and levels).

CIS.HS.7.3.d   Export photos in a usable format.

CIS.HS.7.3.e   Name and store native and exported files in a manageable file structure (i.e., Drive, Cloud, and external hard drives).

CIS.HS.7.3.f   Navigate, organize, and customize the application workspace.

CIS.HS.7.4   **Create and edit digital audio.**

CIS.HS.7.3.a   Select appropriate hardware and software.

CIS.HS.7.3.b   Capture an audio recording.

CIS.HS.7.3.c   Edit digital audio (e.g., trim, delete, and add effects).

CIS.HS.7.3.d   Export audio in a usable format.

CIS.HS.7.3.e   Name and store native and exported files in a manageable file structure (i.e., Drive, Cloud, and external hard drives).

CIS.HS.7.3.f   Navigate, organize, and customize the application workspace.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | DIGITAL MEDIA

DIGITAL MEDIA (cont.)

CIS.HS.7.5   **Create and edit digital video.**

CIS.HS.7.5.a   Select appropriate hardware and software.

CIS.HS.7.5.b   Capture video footage.

CIS.HS.7.5.c   Edit digital video (e.g., trim, delete, and add effects).

CIS.HS.7.5.d   Export video in a usable format.

CIS.HS.7.5.e   Name and store native and exported files in a manageable file structure
                              (i.e., Drive, Cloud, and external hard drives).

CIS.HS.7.5.f   Navigate, organize, and customize the application workspace.

CIS.HS.7.6   **Create and edit motion graphics objects for animation.**

CIS.HS.7.6.a   Select appropriate hardware and software

CIS.HS.7.6.b   Add motion to objects.

CIS.HS.7.6.c   Edit motion graphics (e.g., trim, delete, add effects, etc.).

CIS.HS.7.6.d   Export motion graphics in a usable format.

CIS.HS.7.6.e   Name and store native and exported files in a manageable file structure
                              (i.e., Drive, Cloud, and external hard drives).

CIS.HS.7.6.f   Navigate, organize, and customize the application workspace.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | DIGITAL MEDIA

DIGITAL MEDIA (cont.)

CIS.HS.7.7   Create and edit digital print design.

CIS.HS.7.7.a   Select appropriate hardware and software.

CIS.HS.7.7.b   Apply elements of typographic design in print media (e.g., font selection, size, leading, tracking and kerning, measure, whitespace, hierarchy, and scale).

CIS.HS.7.7.c   Apply basic design principles such as consistency, dominance, palette, eye line, readability, and alignment.

CIS.HS.7.7.d   Name and store native and exported files in a manageable file structure (i.e., Drive, Cloud, and external hard drives).

CIS.HS.7.7.e   Navigate, organize, and customize the application workspace.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | DIGITAL MEDIA

VIDEO PRODUCTION

COURSE DESCRIPTION

Students will expand upon the basics of video production to create projects that will involve a sequence requiring pre-production, production, and post production. The emphasis of video production is to tell stories through interviewing, scripting, and a more professional application of lighting, filming, recording, and editing.

STANDARDS AND INDICATORS:

CIS.HS.17.1 **Use video equipment to create media production projects.**

CIS.HS.17.1.a	Identify and use various types of cameras (e.g., DSLR's, camcorders, drones, etc) to best capture the scene.
CIS.HS.17.1.b	Identify and use various types of camera features (e.g., white balance, iso, fps).
CIS.HS.17.1.c	Demonstrate the functions and uses of camera mounting devices (e.g., monopods, tripods, steadicam, gimbals, etc.).
CIS.HS.17.1.d	Demonstrate different shot compositions (e.g., establishing shot, medium shot, close up, long shot, etc.).
CIS.HS.17.1.e	Demonstrate compositional techniques with a camera (e.g., rule of thirds, framing, balance, background/foreground, headroom, lead room, etc.).
CIS.HS.17.1.f	Demonstrate proper use, maintenance, and care of all equipment and tools.

CIS.HS.17.2 **Use audio equipment to create media production projects.**

CIS.HS.17.2.a	Identify and use various types of microphones (e.g., lavaliere, directional, omnidirectional, shotgun, podcast, etc) to best capture voice, natural sound, ambient sound, background music, and secondary sounds for mood and effect.
CIS.HS.17.2.b	Explain the function of industry standard audio equipment and accessories (e.g., microphones, XLR, 2 Ring (TRS) vs. 3 Ring (TRRS) for headphones, mixing board, cabling, etc.).
CIS.HS.17.2.c	Identify and then troubleshoot sources of interference and poor sound quality.
CIS.HS.17.2.d	Demonstrate proper use, maintenance, and care of all equipment and tools.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | VIDEO PRODUCTION

VIDEO PRODUCTION (cont.)

CIS.HS.17.3   Use lighting to create media production projects.

CIS.HS.17.3.a   Utilize various light sources for effect (e.g., natural light, back light, reflectors, portable lights, box lights, lamps etc.).

CIS.HS.17.3.b   Explain and demonstrate the use of lighting techniques in creating composition, visual continuity, and mood.

CIS.HS.17.3.c   Demonstrate proper use, maintenance, and care of all equipment and tools.

CIS.HS.17.4   Complete pre-production tasks.

CIS.HS.17.4.a   Propose a project to include purpose, target audience, delivery method, selection of cast and crew, best equipment for the job, logistics, and schedule.

CIS.HS.17.4.b   Scout and secure locations for the best lighting, sound, availability, and proper setting for the purpose of the project.

CIS.HS.17.4.c   Create a properly formatted storyboard and shot list for each scene (sketch subjects, draw background, motion/movement, shot numbers, etc.).

CIS.HS.17.5   Develop all parts of the storytelling process.

CIS.HS.17.5.a   Write questions for interviews.

CIS.HS.17.5.b   Write a voice over script.

CIS.HS.17.5.c   Research information as part of the story.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | VIDEO PRODUCTION

VIDEO PRODUCTION (cont.)

CIS.HS.17.6   Perform production tasks.

CIS.HS.17.6.a   Perform the duties of director to create vision as laid forth in pre-production (e.g., disseminate commands and information to cast and crew and execute creative vision).

CIS.HS.17.6.b   Perform the duties of various production roles (i.e., camera operator, sound operator, grip, gaffer, on-air talent, etc.).

CIS.HS.17.6.c   Employ basic lighting techniques for the project (i.e., three-point, natural, artificial, reflectors, etc.).

CIS.HS.17.6.d   Employ appropriate audio recording method for the project.

CIS.HS.17.6.e   Reflect, revise, and refine pre-production decisions as needed.

CIS.HS.17.6.f   Apply different shot compositions when filming (e.g., establishing shot, medium shot, close up, long shot, etc.).

CIS.HS.17.7   Perform post-production tasks.

CIS.HS.17.7.a   Import and organize media to create an efficient workflow (i.e., assemble, review, share, etc.).

CIS.HS.17.7.b   Demonstrate how to perform editing techniques using chosen software (e.g., cuts, trims, color correction, cropping, audio leveling, key framing, chroma key, transitions, compositing, continuity, and fades).

CIS.HS.17.7.c   Determine effect use and placement of titles, text, fonts, colors, graphics, and lower thirds.

CIS.HS.17.7.d   Implement legal and appropriate audio into a project.

CIS.HS.17.7.e   Evaluate video for proper timing and pacing techniques appropriate to the project.

CIS.HS.17.7.f   Differentiate between still image, audio, and digital video extensions and how they function in the project.

CIS.HS.17.7.g   Create, compress, and convert digital video files, still images, and audio files in various formats (e.g., MPEG, WMV, MOV, MP3, MP4, VLC, JPEG, AIFF, AVCHD, etc.).

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | VIDEO PRODUCTION

VIDEO PRODUCTION (cont.)

CIS.HS.17. 8   Describe working in the media production industry.

CIS.HS.17.8.a   Describe best practices employed in the design industry.

CIS.HS.17.8.b   Examine careers in the media production field.

CIS.HS.17.8.c   Identify job market trends in the media production field.

CIS.HS.17.8.d   Identify the benefits of industry certification and higher education in the field.

CIS.HS.17.9   Evaluate and comply with copyright laws.

CIS.HS.17.9.a   Determine the type of copyright, permissions, and licensing required to use specific content.

CIS.HS.17.9.b   Analyze the different types of copyright licenses and their uses. (e.g., Creative Commons, Public Domain).

CIS.HS.17.9.c   Identify legal and ethical considerations for using third-party content, such as copyright, permissions, and licensing.

CIS.HS.17.9.d   Understand copyright as it applies to one's own creative work.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | VIDEO PRODUCTION

MEDIA PRODUCTION

COURSE DESCRIPTION

Students will expand their skills in the creation of media productions such as a news broadcast, video story package, live streaming, radio show, podcast, PSAs, digital signage, short films, documentaries, and other media projects. These skills will prepare students for entry-level positions in the media production field.

STANDARDS AND INDICATORS:

CIS.HS.14.1   Analyze working in the media production field.

CIS.HS.14.1.a   Analyze careers in the media production field.

CIS.HS.14.1.b   Analyze job market trends in the media production field.

CIS.HS.14.1.c   Analyze the benefits of industry certification and higher education in the field.

CIS.HS.14.1.d   Investigate careers in media production.

CIS.HS.14.2   Identify and describe the roles and responsibilities for the cast and crew.

CIS.HS.14.2.a   Describe the hierarchy of the production leadership crew (e.g., Executive Producer, Producer, or Director).

CIS.HS.14.2.b   Identify the roles and duties of the production crew (i.e., actor, on-camera reporter, writer, announcer, play-by-play announcer, color commentary announcer, camera operator, sound board, etc.)

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | MEDIA PRODUCTION

MEDIA PRODUCTION (cont.)

CIS.HS.14.3   **Simulate working in the media production field through the creation of client-based media projects.**

    CIS.HS.14.3.a   Compare and contrast the various roles involved in media production.

    CIS.HS.14.3.b   Interpret the client's purpose, audience, and audience needs for preparing media to ensure the content is relevant.

    CIS.HS.14.3.c   Prepare a production schedule (e.g., creating and using a work plan, establishing milestones and deliverables).

    CIS.HS.14.3.d   Describe the importance of branding as it applies to client-based media production projects.

    CIS.HS.14.3.e   Communicate in person and through written communication with peers and clients about production plans and processes.

    CIS.HS.14.3.f   Distribute a final product to the target audience using appropriate outlets.

    CIS.HS.14.3.g   Evaluate effectiveness, analytics, and feedback from the media production.

CIS.HS.14.4   **Research, report, and synthesize information from interviews as part of the storytelling process.**

    CIS.HS.14.4.a   Identify the components of a compelling video story.

    CIS.HS.14.4.b   Write open-ended questions for interviews.

    CIS.HS.14.4.c   Conduct interviews with subjects.

    CIS.HS.14.4.d   Incorporate information from research and interviews to write a voice over script appropriate to the project.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | MEDIA PRODUCTION

MEDIA PRODUCTION (cont.)

CIS.HS.14.5 **Demonstrate technical skills for broadcast, video, Internet, audio, and/or mobile production.**

CIS.HS.14.5.a Demonstrate proficiency using equipment and software during recording and post-production applications.

CIS.HS.14.5.b Research and evaluate trends in new equipment, software, and techniques.

CIS.HS.14.6 **Evaluate and comply with copyright laws.**

CIS.HS.14.6.a Determine the type of copyright, permissions, and licensing required to use specific content.

CIS.HS.14.6.b Analyze the different types of copyright licenses and their uses. (e.g., Creative Commons, Public Domain).

CIS.HS.14.6.c   Identify legal and ethical considerations for using third-party content, such as copyright, permissions, and licensing.

CIS.HS.14.6.d Apply copyright as it pertains to one's own creative work.

CIS.HS.14.7 **Create a digital portfolio which demonstrates competency in the Media Production field.**

CIS.HS.14.7.a Examine professional digital portfolios as models.

CIS.HS.14.7.b Evaluate all elements of the portfolio for compliance with copyright.

CIS.HS.14.7.c Curate works for the portfolio that demonstrates media production skills.

CIS.HS.14.7.d Design portfolio so that it demonstrates principles of good design.

CIS.HS.14.7.e Choose language to ensure copyright protections of the student work.

CIS.HS.14.7.f Explain the importance of branding as it applies to their portfolio of creative work.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | MEDIA PRODUCTION

FOUNDATIONS OF WEB DESIGN

COURSE DESCRIPTION

Students will demonstrate knowledge of web and mobile app design to create an effective website or app that captures and keeps visitors' interests. Students will demonstrate project management skills, while also enhancing creativity, problem solving, and critical thinking. Students will explore career opportunities in an information technology career field.

STANDARDS AND INDICATORS:

CIS.HS.9.1 **Explain and apply appropriate web design language and terminology.**

CIS.HS.9.1.a   Describe the principles and goals of website design.

CIS.HS.9.1.b   Describe the principles and goals of responsive design.

CIS.HS.9.1.c   Describe binary code.

CIS.HS.9.1.d   Define common industry terminology.

CIS.HS.9.2 **Plan a website and/or app for a specific purpose.**

CIS.HS.9.2.a   Develop a storyboard, mock-up, and wireframes for a website and/or app.

CIS.HS.9.2.b   Explain the design process in regards to audience, layout, time, and budget.

CIS.HS.9.2.c   Identify the target market audience's needs.

CIS.HS.9.2.d   Evaluate clients' needs based on current trends.

CIS.HS.9.2.e   Plan for responsive design.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | FOUNDATIONS OF WEB DESIGN

FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.3   **Analyze elements and principles of design to communicate ideas consistent with project goals.**

CIS.HS.9.3.a   Apply appropriate font and font family concepts.

CIS.HS.9.3.b   Demonstrate knowledge of design decisions in regards to shapes, lines, colors.

CIS.HS.9.3.c   Demonstrate knowledge of design decisions in regards to white space, margins, and layout of graphic and text.

CIS.HS.9.3.d   Incorporate text layout techniques such as kerning, leading, and alignment.

CIS.HS.9.3.e   Incorporate audio, visual, and graphic elements.

CIS.HS.9.3.f   Develop a focused concept, clear methods of conveyance, and unified theme that solves the given problem.

CIS.HS.9.3.g   Identify accessibility and standard compliance measures in order to communicate with a broad audience.

CIS.HS.9.3.h   Explain design decisions in regards to themes.

CIS.HS.9.3.i   Evaluate the impact of design decisions on the theme of a design.

CIS.HS.9.3.j   Explain design and project goals using a storyboard, mock-up, and wireframes.

CIS.HS.9.4   **Analyze legal and ethical responsibilities.**

CIS.HS.9.4.a   Apply copyright laws as appropriate in website and app creation.

CIS.HS.9.4.b   Discuss security issues that are related to the utilization of the computer and/or Internet.

CIS.HS.9.4.c   Describe situations where web pages and/or apps may be used unethically.

CIS.HS.9.4.d   Describe licensing agreements.

CIS.HS.9 4.e   Discuss the importance of creative commons.

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FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.5 **Create and test websites and/or apps designed for cross browser and mobile compatibility.**

    CIS.HS.9.5.a   Utilize standards-compliant elements in code that delivers essential content and functionality if older browsers are not capable of displaying content.

    CIS.HS.9.5.b   Create websites and/or apps that utilize responsive design to allow for a variety of screen sizes and geometries to view the content in a meaningful and logical fashion.

    CIS.HS.9.5.c   Test an application on devices of varying geometries and operating system versions to ensure maximum compatibility.

CIS.HS.9.6 **Implement quality assurance processes to deliver effective digital communication.**

    CIS.HS.9.6.a   Evaluate the website and/or app functionality.

    CIS.HS.9.6.b   Test a website and/or app in a variety of environments.

    CIS.HS.9.6.c   Evaluate site effectiveness through user search and accessibility to meet all audience needs.

    CIS.HS.9.6.d   Investigate web hosts.

    CIS.HS.9.6.e   Troubleshoot and maintain a website and/or app.

    CIS.HS.9.6.f   Evaluate cross-browser compatibility.

    CIS.HS.9.6.g   Identify the process of securing a domain name.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | FOUNDATIONS OF WEB DESIGN

FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.7 **Critique a website and/or app in accordance with web design principles.**

CIS.HS.9.7.a   Assess download time.

CIS.HS.9.7.b   Assess readability of the website and/or app.

CIS.HS.9.7.c   Assess ease of navigation for both website and/or app.

CIS.HS.9.7.d   Assess the design theme of a website and/or app.

CIS.HS.9.7.e   Assess consistency of the theme across the entire website and/or app.

CIS.HS.9.7.f   Assess the functionality of links.

CIS.HS.9.8 **Identify opportunities in an information technology career field including but not limited to entrepreneurial opportunities, responsibilities, education, and certification.**

CIS.HS.9.8.a   Identify information technologies used in various industries.

CIS.HS.9.8.b   Discuss the impact of technology on all career fields.

CIS.HS.9.8.c   Identify common tasks in career fields.

CIS.HS.9.8.d   Discuss career opportunities in information technology career fields.

CIS.HS.9.8.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BROADCAST JOURNALISM | FOUNDATIONS OF WEB DESIGN

DIGITAL MEDIA

COURSE DESCRIPTION

Students will learn and apply copyright laws while using industry standard digital tools to create, design, and produce digital media including sound, video, motion graphics, and print design following rules of composition and basic design principles.

STANDARDS AND INDICATORS:

CIS.HS.7.1   Evaluate and comply with copyright laws.

CIS.HS.7.1.a   Define terms such as infringement and fair use, royalty free and copyright free, and public domain.

CIS.HS.7.1.b   Locate sources of royalty-free music, images, graphics, and video.

CIS.HS.7.1.c   Define copyright as it applies to their own creative work.

CIS.HS.7.1.d   Select audio, video, still images, and art that are royalty free and/or abide by the licensing agreement under Creative Commons usage.

CIS.HS.7.1.e   Analyze the different types of copyright licenses and their uses. (e.g., Creative Commons, Public Domain…)

CIS.HS.7.2   Demonstrate composition techniques.

CIS.HS.7.2.a   Demonstrate rules of composition (e.g., rule of thirds, point-of-view, framing).

CIS.HS.7.2.b   Demonstrate a variety of photographic/video shots using a digital camera or video camera (e.g., establishing, close up, mid-shot, wide, over the shoulder).

CIS.HS.7.2.c   Demonstrate elements of typographic design in print media (e.g., font selection, size, leading, tracking and kerning, measure, whitespace, hierarchy, and scale).

CIS.HS.7.2.d   Demonstrate basic design principles such as consistency, dominance, palette, eye line, readability, alignment, and color theory.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | DIGITAL MEDIA

DIGITAL MEDIA (cont.)

CIS.HS.7.3   **Create and edit digital photographic images.**

CIS.HS.7.3.a   Select appropriate hardware and software.

CIS.HS.7.3.b   Capture still photographic images.

CIS.HS.7.3.c   Edit still photos (e.g., cropping, color correction, layers, and levels).

CIS.HS.7.3.d   Export photos in a usable format.

CIS.HS.7.3.e   Name and store native and exported files in a manageable file structure (i.e., Drive, Cloud, and external hard drives).

CIS.HS.7.3.f   Navigate, organize, and customize the application workspace.

CIS.HS.7.4   **Create and edit digital audio.**

CIS.HS.7.4.a   Select appropriate hardware and software.

CIS.HS.7.4.b   Capture an audio recording.

CIS.HS.7.4.c   Edit digital audio (e.g., trim, delete, and add effects).

CIS.HS.7.4.d   Export audio in a usable format.

CIS.HS.7.4.e   Name and store native and exported files in a manageable file structure (i.e., Drive, Cloud, and external hard drives).

CIS.HS.7.4.f   Navigate, organize, and customize the application workspace.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | DIGITAL MEDIA

DIGITAL MEDIA (cont.)

CIS.HS.7.5   Create and edit digital video.

CIS.HS.7.5.a   Select appropriate hardware and software.

CIS.HS.7.5.b   Capture video footage.

CIS.HS.7.5.c   Edit digital video (e.g., trim, delete, and add effects).

CIS.HS.7.5.d   Export video in a usable format.

CIS.HS.7.5.e   Name and store native and exported files in a manageable file structure (i.e., Drive, Cloud, and external hard drives).

CIS.HS.7.5.f   Navigate, organize, and customize the application workspace.

CIS.HS.7.6   Create and edit motion graphics objects for animation.

CIS.HS.7.6.a   Select appropriate hardware and software

CIS.HS.7.6.b   Add motion to objects.

CIS.HS.7.6.c   Edit motion graphics (e.g., trim, delete, add effects, etc.).

CIS.HS.7.6.d   Export motion graphics in a usable format.

CIS.HS.7.6.e   Name and store native and exported files in a manageable file structure (i.e., Drive, Cloud, and external hard drives).

CIS.HS.7.6.f   Navigate, organize, and customize the application workspace.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | DIGITAL MEDIA

DIGITAL MEDIA (cont.)

CIS.HS.7.7   Create and edit digital print design.

CIS.HS.7.7.a   Select appropriate hardware and software.

CIS.HS.7.7.b   Apply elements of typographic design in print media (e.g., font selection, size, leading, tracking and kerning, measure, whitespace, hierarchy, and scale).

CIS.HS.7.7.c   Apply basic design principles such as consistency, dominance, palette, eye line, readability, and alignment.

CIS.HS.7.7.d   Name and store native and exported files in a manageable file structure (i.e., Drive, Cloud, and external hard drives).

CIS.HS.7.7.e   Navigate, organize, and customize the application workspace.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | DIGITAL MEDIA

DIGITAL DESIGN

COURSE DESCRIPTION

Students will focus on developing skills to plan, design, and create digital design projects using elements of composition, digital photography, and digital print design.

STANDARDS AND INDICATORS:

CIS.HS.6.1   Utilize composition techniques.

CIS.HS.6.1.a   Demonstrate rules of composition (e.g., rule of thirds, point-of-view, framing).

CIS.HS.6.1.b   Demonstrate a variety of photographic shots using a digital camera.

CIS.HS.6.1.c   Demonstrate elements of typographic design in print media (e.g., font selection, size, leading, tracking and kerning, measure, whitespace, hierarchy and scale).

CIS.HS.6.1.d   Demonstrate basic design principles such as consistency, dominance, palette, eye line, readability, alignment, and color theory.

CIS.HS.6.1.e   Differentiate between bitmap, raster, and vector images.

CIS.HS.6.2   Create and edit digital photographic images.

CIS.HS.6.2.a   Select appropriate hardware and software.

CIS.HS.6.2.b   Capture still photographic images.

CIS.HS.6.2.c   Edit still photos (e.g., cropping, color correction, layers, and levels).

CIS.HS.6.2.d   Apply multiple camera modes.

CIS.HS.6.2.e   Apply light and color principles to projects.

CIS.HS.6.2.f   Apply image stabilization.

CIS.HS.6.2.g   Apply exposure, shutter speed, and aperture.

CIS.HS.6.2.h   Export photos in a usable format.

CIS.HS.6.2.i   Name and store native and exported files in a manageable file structure (i.e.: Drive, Cloud, or external hard drive).

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | DIGITAL DESIGN

DIGITAL DESIGN (cont.)

CIS.HS.6.3   **Create and edit digital print design.**

CIS.HS.6.3.a   Select appropriate hardware and software.

CIS.HS.6.3.b   Apply elements of typographic design in print media (e.g., font selection, size, leading, tracking and kerning, measure, whitespace, hierarchy and scale).

CIS.HS.6.3.c   Apply basic design principles such as consistency, dominance, palette, eye line, readability, and alignment.

CIS.HS.6.3.d   Demonstrate knowledge of page layout (e.g.,negative space, alignment, symmetrical, and asymmetrical).

CIS.HS.6.3.e   Use layers to manage design elements and modify layer visibility using opacity and masks.

CIS.HS.6.3.f   Make, manage, and manipulate selections.

CIS.HS.6.3.g   Name and store native and exported files in a manageable file structure (ie: Drive, Cloud, or external hard drive).

CIS.HS.6.3.h   Explain the difference between modes of a print document: CMYK, RGB, grayscale, bitmap.

CIS.HS.6.4   **Create and edit motion graphics objects for animation.**

CIS.HS.6.4.a   Select appropriate hardware and software.

CIS.HS.6.4.b   Add motion to objects as a project or to enhance a project.

CIS.HS.6.4.c   Edit motion graphics (e.g., trim, delete, add effects, etc.).

CIS.HS.6.4.d   Export a motion graphic in a usable format.

CIS.HS.6.4.e   Name and store native and exported files in a manageable file structure i.e., Drive, Cloud, or external hard drive).

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | DIGITAL DESIGN

DIGITAL DESIGN (cont.)

CIS.HS.6.5   Describe working in the digital design field.

CIS.HS.6.5.a   Identify the purpose, audience, and audience needs for preparing images.

CIS.HS.6.5.b   Determine whether content is relevant to the purpose, audience, and audience needs.

CIS.HS.6.5.c   Demonstrate knowledge of basic design principles and understand best practices employed in the digital design field.

CIS.HS.6.5.d   Examine careers in the digital design field.

CIS.HS.6.5.e   Identify job market trends in the digital design field.

CIS.HS.6.5.f   Identify the benefits of industry certification and higher education in the field.

CIS.HS.6.6   Evaluate and comply with copyright laws.

CIS.HS.6.6.a   Determine the type of copyright, permissions, and licensing required to use specific content.

CIS.HS.6.6.b   Analyze the different types of copyright licenses and their uses.
(e.g., Creative Commons, or Public Domain).

CIS.HS.6.6.c   Identify legal and ethical considerations for using third-party content, such as copyright, permissions, and licensing.

CIS.HS.6.6.d   Understand copyright as it applies to their own creative work.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | DIGITAL DESIGN

ADVANCED DIGITAL DESIGN

COURSE DESCRIPTION

Students will focus on utilizing advanced skills to plan, design, and create a design portfolio to showcase elements of composition, digital photography, or digital print design. These skills will prepare students for entry-level positions in the digital design field.

STANDARDS AND INDICATORS:

CIS.HS.1.1 **Design client-based or personal projects utilizing composition techniques.**

CIS.HS.1.1.a   Compose photographic, digital print design, or animation projects utilizing design and composition rules.

CIS.HS.1.1.b   Select appropriate hardware and software based on the final product needed by client.

CIS.HS.1.1.c   Demonstrate rules of composition.

CIS.HS.1.1.d   Construct a project and justify chosen design principles.

CIS.HS.1.1.e   Name and store native and exported files in a manageable file structure (i.e., Drive, Cloud, external hard drive).

CIS.HS.1.2 **Design graphics and text that clearly express the personal perspective of intended audiences.**

CIS.HS.1.2.a   Identify purpose, audience, and audience needs for preparing images.

Determine whether content is relevant to the purpose, audience, and audience needs.

CIS.HS.1.2.b   Prepare a production schedule (e.g., creating and using a work plan, establishing milestones and deliverables).

CIS.HS.1.2.c   Assess and utilize design principles and best practices employed in the design field.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | ADVANCED DIGITAL DESIGN

ADVANCED DIGITAL DESIGN (cont.)

CIS.HS.1.3   **Simulate working in the digital design field through creation of client-based design projects.**

CIS.HS.1.3.a   Describe the client's purpose and audience when preparing projects to ensure the content is relevant to the client's needs.

CIS.HS.1.3.b   Prepare a production schedule (e.g., creating and using a work plan, establishing milestones and deliverables).

CIS.HS.1.3.c   Assess and utilize design principles and best practices employed in the design field.

CIS.HS.1.3.d   Describe the importance of branding as it applies to client-based design projects.

CIS.HS.1.3.e   Communicate effectively in person and through written communication with peers and clients about design plans and processes.

CIS.HS.1.4   **Analyze working in the digital design field.**

CIS.HS.1.4.a   Analyze careers in the digital design field.

CIS.HS.1.4.b   Analyze job market trends in the digital design field.

CIS.HS.1.4.c   Analyze the benefits of industry certification and higher education in the field.

CIS.HS.1.4.d   Investigate careers in digital design through pursuit of a job shadowing or internship experience.

ADVANCED DIGITAL DESIGN (cont.)

CIS.HS.1.5   **Evaluate and comply with copyright laws.**

     CIS.HS.1.5.a   Determine the type of copyright, permissions, and licensing required to use specific content.

     CIS.HS.1.5.b   Analyze the different types of copyright licenses and their uses. (e.g., Creative Commons, Public Domain).

     CIS.HS.1.5.c   Identify legal and ethical considerations for using third-party content, such as copyright, permissions, and licensing.

     CIS.HS.1.5.d   Apply copyright as it pertains to their own creative work.

CIS.HS.1.6   **Create a digital portfolio which demonstrates competency in the digital design field.**

     CIS.HS.1.6.a   Examine professional digital portfolios as models.

     CIS.HS.1.6.b   Evaluate all elements of the portfolio for compliance with copyright.

     CIS.HS.1.6.c   Curate works for the portfolio that demonstrate mastery of design.

     CIS.HS.1.6.d   Design portfolio itself so that it demonstrates mastery of design.

     CIS.HS.1.6.e   Choose language to ensure copyright protections of the student work.

     CIS.HS.1.6.f   Describe the importance of branding as it applies to their portfolio of creative work.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | ADVANCED DIGITAL DESIGN

FOUNDATIONS OF WEB DESIGN

COURSE DESCRIPTION

Students will demonstrate knowledge of web and mobile app design to create an effective website or app that captures and keeps visitors' interests. Students will demonstrate project management skills, while also enhancing creativity, problem solving, and critical thinking. Students will explore career opportunities in an information technology career field.

STANDARDS AND INDICATORS:

CIS.HS.9.1   Explain and apply appropriate web design language and terminology.

CIS.HS.9.1.a   Describe the principles and goals of website design.

CIS.HS.9.1.b   Describe the principles and goals of responsive design.

CIS.HS.9.1.c   Describe binary code.

CIS.HS.9.1.d   Define common industry terminology.

CIS.HS.9.2   Plan a website and/or app for a specific purpose.

CIS.HS.9.2.a   Develop a storyboard, mock-up, and wireframes for a website and/or app.

CIS.HS.9.2.b   Explain the design process in regards to audience, layout, time, and budget.

CIS.HS.9.2.c   Identify the target market audience's needs.

CIS.HS.9.2.d   Evaluate clients' needs based on current trends.

CIS.HS.9.2.e   Plan for responsive design.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | FOUNDATIONS OF WEB DESIGN

FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.3   **Analyze elements and principles of design to communicate ideas consistent with project goals.**

CIS.HS.9.3.a   Apply appropriate font and font family concepts.

CIS.HS.9.3.b   Demonstrate knowledge of design decisions in regards to shapes, lines, colors.

CIS.HS.9.3.c   Demonstrate knowledge of design decisions in regards to white space, margins, and layout of graphic and text.

CIS.HS.9.3.d   Incorporate text layout techniques such as kerning, leading, and alignment.

CIS.HS.9.3.e   Incorporate audio, visual, and graphic elements.

CIS.HS.9.3.f   Develop a focused concept, clear methods of conveyance, and unified theme that solves the given problem.

CIS.HS.9.3.g   Identify accessibility and standard compliance measures in order to communicate with a broad audience.

CIS.HS.9.3.h   Explain design decisions in regards to themes.

CIS.HS.9.3.i   Evaluate the impact of design decisions on the theme of a design.

CIS.HS.9.3.j   Explain design and project goals using a storyboard, mock-up, and wireframes.

CIS.HS.9.4   **Analyze legal and ethical responsibilities.**

CIS.HS.9.4.a   Apply copyright laws as appropriate in website and app creation.

CIS.HS.9.4.b   Discuss security issues that are related to the utilization of the computer and/or Internet.

CIS.HS.9.4.c   Describe situations where web pages and/or apps may be used unethically.

CIS.HS.9.4.d   Describe licensing agreements.

CIS.HS.9.4.e   Discuss the importance of creative commons.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | FOUNDATIONS OF WEB DESIGN

FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.5   **Create and test websites and/or apps designed for cross browser and mobile compatibility.**

     CIS.HS.9.5.a   Utilize standards-compliant elements in code that delivers essential content and functionality if older browsers are not capable of displaying content.

     CIS.HS.9.5.b   Create websites and/or apps that utilize responsive design to allow for a variety of screen sizes and geometries to view the content in a meaningful and logical fashion.

     CIS.HS.9.5.c   Test an application on devices of varying geometries and operating system versions to ensure maximum compatibility.

CIS.HS.9.6   **Implement quality assurance processes to deliver effective digital communication.**

     CIS.HS.9.6.a   Evaluate the website and/or app functionality.

     CIS.HS.9.6.b   Test a website and/or app in a variety of environments.

     CIS.HS.9.6.c   Evaluate site effectiveness through user search and accessibility to meet all audience needs.

     CIS.HS.9.6.d   Investigate web hosts.

     CIS.HS.9.6.e   Troubleshoot and maintain a website and/or app.

     CIS.HS.9.6.f   Evaluate cross-browser compatibility.

     CIS.HS.9.6.g   Identify the process of securing a domain name.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | FOUNDATIONS OF WEB DESIGN

FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.7   **Critique a website and/or app in accordance with web design principles.**

  CIS.HS.9.7.a   Assess download time.

  CIS.HS.9.7.b   Assess readability of the website and/or app.

  CIS.HS.9.7.c   Assess ease of navigation for both website and/or app.

  CIS.HS.9.7.d   Assess the design theme of a website and/or app.

  CIS.HS.9.7.e   Assess consistency of the theme across the entire website and/or app.

  CIS.HS.9.7.f   Assess the functionality of links.

CIS.HS.9.8   **Identify opportunities in an information technology career field including but not limited to entrepreneurial opportunities, responsibilities, education, and certification.**

  CIS.HS.9.8.a   Identify information technologies used in various industries.

  CIS.HS.9.8.b   Discuss the impact of technology on all career fields.

  CIS.HS.9.8.c   Identify common tasks in career fields.

  CIS.HS.9.8.d   Discuss career opportunities in information technology career fields.

  CIS.HS.9.8.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DIGITAL DESIGN | FOUNDATIONS OF WEB DESIGN

INFORMATION TECHNOLOGY APPLICATIONS I

COURSE DESCRIPTION

Students will explore emerging technologies as it applies to success in high school, college, and career. The focus will be on the importance of digital citizenship, professional communication practices, advanced document processing, professional presentations, and intermediate spreadsheet and database applications used personally and professionally.

STANDARDS AND INDICATORS:

CIS.HS.10.1   **Model positive digital citizenship by applying industry-accepted ethical practices and behaviors.**

CIS.HS.10.1.a   Examine and practice cultural, social, ethical, and legal issues associated with information technology.

CIS.HS.10.1.b   Formulate a critical stance by questioning the validity, accuracy, and appropriateness of information.

CIS.HS.10.1.c   Demonstrate a variety of strategies for effective and efficient searches.

CIS.HS.10.1.d   Evaluate safety and security measures for protecting information and developing digital footprints.

CIS.HS.10.2   **Use document processing applications to prepare business communications.**

CIS.HS.10.2.a   Create, edit, and customize documents using advanced techniques.

CIS.HS.10.2.b   Prepare and troubleshoot merged documents (e.g., envelopes, mailings, labels).

CIS.HS.10.2.c   Apply digital design strategies to design professional documents (e.g., graphic design, layout, typography, font face, font style).

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | IT APPLICATIONS I

INFORMATION TECHNOLOGY APPLICATIONS I (cont.)

CIS.HS.10.3   **Develop and demonstrate effective communication skills and practices.**

CIS.HS.10.3.a   Prepare and develop presentations that can be used in a current workplace.

CIS.HS.10.3.b   Compose electronic communication to communicate within a workplace.

CIS.HS.10.3.c   Customize a presentation using advanced features for a specific audience.

CIS.HS.10.4   **Organize and manipulate data using spreadsheet applications.**

CIS.HS.10.4.a   Enter and modify worksheet data and structure, format data, and problem solve in a worksheet.

CIS.HS.10.4.b   Sort and manipulate data using formulas and functions.

CIS.HS.10.4.c   Create visual representations of data (e.g., charts, pivot tables, sparklines, and conditional formatting)

CIS.HS.10.5   **Identify database management concepts to manage, evaluate, and organize information.**

CIS.HS.10.5.a   Compare and contrast methods for storing, organizing, and retrieving data.

CIS.HS.10.5.b   Sort and manipulate data using formulas and functions and create charts.

CIS.HS.10.5.c   Create and format a database.

CIS.HS.10.5.d   Create database objects (e.g., tables, forms, queries).

CIS.HS.10.5.e   Modify or enter records, create reports, and/or sort data.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | IT APPLICATIONS I

INFORMATION TECHNOLOGY APPLICATIONS I (cont.)

CIS.HS.10.6 **Identify opportunities in an information technology career field including but not limited to entrepreneurial opportunities, responsibilities, education, and certification.**

CIS.HS.10.6.a   Identify information technologies used in various industries.

CIS.HS.10.6.b   Discuss the impact of technology on all career fields.

CIS.HS.10.6.c   Identify common information technology tasks in career fields.

CIS.HS.10.6.d   Discuss career opportunities in information technology career fields.

CIS.HS.10.6.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

CIS.HS.10.7 **Describe emerging and evolving trends in information technology.**

CIS.HS.10.7.a   Investigate emerging trends in technology and their impact on business and industry.

CIS.HS.10.7.b   Interact with new and emerging technologies.

CIS.HS.10.7.c   Identify emerging technologies to create and evaluate forms of communication.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | IT APPLICATIONS I

INFORMATION TECHNOLOGY APPLICATIONS II

COURSE DESCRIPTION

This course will focus on skill development in data science using word processing, spreadsheets, databases, and integration of applications utilizing advanced features. Students taking both Information Technology Applications I and II may be eligible for dual credit at a participating postsecondary institution. Skills, standards, and coursework align with industry certifications.

STANDARDS AND INDICATORS:

CIS.HS.11.1   **Organize, aggregate, and manipulate data using advanced word processing features.**

CIS.HS.11.1.a   Integrate other program files into word processing documents (insert, embed, and link).

CIS HS.11.1.b   Create and format tables using advanced features (formulas, styles).

CIS HS.11.1.c   Use advanced merge features to integrate spreadsheet and database information into the word processing document as fields and records.

CIS.HS.11.1.d   Create and manage styles.

CIS.HS.11.1.e   Plan, record, run, and edit Macros.

CIS.HS.11.2   **Organize, aggregate, and manipulate data using advanced spreadsheet features.**

CIS.HS.11.2.a   Create worksheet structures using formulas and advanced features. (e.g., logical statements, vLookup, financial, statistical functions, and named ranges).

CIS.HS.11.2.b   Interpret data through statistical analysis (e.g., sorting, filtering, forecasting, and pivot tables).

CIS.HS.11.2.c   Import, export, and share worksheet data.

CIS.HS.11.2.d   Customize formatting methods, including conditional formatting and other advanced formatting methods.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | IT APPLICATIONS 2

INFORMATION TECHNOLOGY APPLICATIONS II (cont.)

CIS.HS.11.3   **Synthesize relational database concepts to design, manage, evaluate, and organize information.**

     CIS.HS.11.3.a   Design tables specifying properties for data entry and relationships.

     CIS.HS.11.3b   Construct multi-table queries to retrieve, organize, and aggregate data to draw conclusions.

     CIS.HS.11.3.c   Design forms and subforms for efficient and effective data entry or retrieval.

     CIS.HS.11.3.d   Design reports and subreports utilizing tables, graphs, sparklines, and pivot tables for displaying meaningful data.

     CIS.HS.11.3.e   Analyze relational data using Structure Query Language (SQL).

CIS.HS.11.4   **Consider the relationship between different programs to utilize data in one program to the next to create new documents.**

     CIS.HS.11.4.a   Utilize spreadsheets, presentation, and database information in word processing documents.

     CIS.HS.11.4.b   Utilize word processing, presentation, and database information in a spreadsheet.

     CIS.HS.11.4.c   Utilize word processing, spreadsheet, and database information in a presentation.

     CIS.HS.11.4.d   Utilize word processing and spreadsheet information in a database.

CIS.HS.11.5   **Describe the importance of ethical data collection and applicable conclusions.**

     CIS.HS.11.5.a   Analyze the privacy practices of data collection and use.

     CIS.HS.11.5.b   Analyze the security practices of data collection and use.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | IT APPLICATIONS 2

INFORMATION TECHNOLOGY APPLICATIONS II (cont.)

CIS.HS.11.6   **Demonstrate critical thinking skills to integrate information technology tools to access, manage, and create new information.**

    CIS.HS.11.6.a   Gather, evaluate, use, and disseminate information from multiple technology sources.

    CIS.HS.11.6.b   Create purposeful, digitally designed products (e.g., brochure, presentation, website, portfolio).

CIS.HS.11.7   **Identify opportunities in an information technology career field including but not limited to entrepreneurial opportunities, responsibilities, education, and certification.**

    CIS.HS.11.7.a   Identify information technologies used in various industries.

    CIS.HS.11.7.b   Discuss the impact of technology on all career fields.

    CIS.HS 11.7.c   Identify common tasks in career fields.

    CIS.HS 11.7.d   Discuss career opportunities in information technology career fields.

    CIS.HS.11.7.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

    CIS.HS.11.7.f   Identify the benefits of industry certification and higher education Programs.

    CIS.HS.11.7.g   Identify the necessary skills to succeed in fields using data science.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | IT APPLICATIONS 2

DIGITAL DESIGN

COURSE DESCRIPTION

Students will focus on developing skills to plan, design, and create digital design projects using elements of composition, digital photography, and digital print design.

STANDARDS AND INDICATORS:

CIS.HS.6.1   **Utilize composition techniques.**

CIS.HS.6.1.a   Demonstrate rules of composition (e.g., rule of thirds, point-of-view, framing).

CIS.HS.6.1.b   Demonstrate a variety of photographic shots using a digital camera.

CIS.HS.6.1.c   Demonstrate elements of typographic design in print media (e.g., font selection, size, leading, tracking and kerning, measure, whitespace, hierarchy and scale).

CIS.HS.6.1.d   Demonstrate basic design principles such as consistency, dominance, palette, eye line, readability, alignment, and color theory.

CIS.HS.6.1.e   Differentiate between bitmap, raster, and vector images.

CIS.HS.6.2   **Create and edit digital photographic images.**

CIS.HS.6.2.a   Select appropriate hardware and software.

CIS.HS.6.2.b   Capture still photographic images.

CIS.HS.6.2.c   Edit still photos (e.g., cropping, color correction, layers, and levels).

CIS.HS.6.2.d   Apply multiple camera modes.

CIS.HS.6.2.e   Apply light and color principles to projects.

CIS.HS.6.2.f   Apply image stabilization.

CIS.HS.6.2.g   Apply exposure, shutter speed, and aperture.

CIS.HS.6.2.h   Export photos in a usable format.

CIS.HS.6.2.i   Name and store native and exported files in a manageable file structure (i.e.: Drive, Cloud, or external hard drive).

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | DIGITAL DESIGN

DIGITAL DESIGN (cont.)

CIS.HS.6.3   **Create and edit digital print design.**

CIS.HS.6.3.a   Select appropriate hardware and software.

CIS.HS.6.3.b   Apply elements of typographic design in print media (e.g., font selection, size, leading, tracking and kerning, measure, whitespace, hierarchy and scale).

CIS.HS.6.3.c   Apply basic design principles such as consistency, dominance, palette, eye line, readability, and alignment.

CIS.HS.6.3.d   Demonstrate knowledge of page layout (e.g.,negative space, alignment, symmetrical, and asymmetrical).

CIS.HS.6.3.e   Use layers to manage design elements and modify layer visibility using opacity and masks.

CIS.HS.6.3.f   Make, manage, and manipulate selections.

CIS.HS.6.3.g   Name and store native and exported files in a manageable file structure (ie: Drive, Cloud, or external hard drive).

CIS.HS.6.3.h   Explain the difference between modes of a print document: CMYK, RGB, grayscale, bitmap.

CIS.HS.6.4   **Create and edit motion graphics objects for animation.**

CIS.HS.6.4.a   Select appropriate hardware and software.

CIS.HS.6.4.b   Add motion to objects as a project or to enhance a project.

CIS.HS.6.4.c   Edit motion graphics (e.g., trim, delete, add effects, etc.).

CIS.HS.6.4.d   Export a motion graphic in a usable format.

CIS.HS.6.4.e   Name and store native and exported files in a manageable file structure i.e., Drive, Cloud, or external hard drive).

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | DIGITAL DESIGN

DIGITAL DESIGN (cont.)

CIS.HS.6.5   **Describe working in the digital design field.**

     CIS.HS.6.5.a   Identify the purpose, audience, and audience needs for preparing images.

     CIS.HS.6.5.b   Determine whether content is relevant to the purpose, audience, and audience needs.

     CIS.HS.6.5.c   Demonstrate knowledge of basic design principles and understand best practices employed in the digital design field.

     CIS.HS.6.5.d   Examine careers in the digital design field.

     CIS.HS.6.5.e   Identify job market trends in the digital design field.

     CIS.HS.6.5.f   Identify the benefits of industry certification and higher education in the field.

CIS.HS.6.6   **Evaluate and comply with copyright laws.**

     CIS.HS.6.6.a   Determine the type of copyright, permissions, and licensing required to use specific content.

     CIS.HS.6.6.b   Analyze the different types of copyright licenses and their uses. (e.g., Creative Commons, or Public Domain).

     CIS.HS.6.6.c   Identify legal and ethical considerations for using third-party content, such as copyright, permissions, and licensing.

     CIS.HS.6.6.d   Understand copyright as it applies to their own creative work.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | DIGITAL DESIGN

FOUNDATIONS OF WEB DESIGN

COURSE DESCRIPTION

Students will demonstrate knowledge of web and mobile app design to create an effective website or app that captures and keeps visitors' interests. Students will demonstrate project management skills, while also enhancing creativity, problem solving, and critical thinking. Students will explore career opportunities in an information technology career field.

STANDARDS AND INDICATORS:

CIS.HS.9.1   Explain and apply appropriate web design language and terminology.

CIS.HS.9.1.a   Describe the principles and goals of website design.

CIS.HS.9.1.b   Describe the principles and goals of responsive design.

CIS.HS.9.1.c   Describe binary code.

CIS.HS.9.1.d   Define common industry terminology.

CIS.HS.9.2   Plan a website and/or app for a specific purpose.

CIS.HS.9.2.a   Develop a storyboard, mock-up, and wireframes for a website and/or app.

CIS.HS.9.2.b   Explain the design process in regards to audience, layout, time, and budget.

CIS.HS.9.2.c   Identify the target market audience's needs.

CIS.HS.9.2.d   Evaluate clients' needs based on current trends.

CIS.HS.9.2.e   Plan for responsive design.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | FOUNDATIONS OF WEB DESIGN

FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.3   **Analyze elements and principles of design to communicate ideas consistent with project goals.**

    CIS.HS.9.3.a   Apply appropriate font and font family concepts.

    CIS.HS.9.3.b   Demonstrate knowledge of design decisions in regards to shapes, lines, colors.

    CIS.HS.9.3.c   Demonstrate knowledge of design decisions in regards to white space, margins, and layout of graphic and text.

    CIS.HS.9.3.d   Incorporate text layout techniques such as kerning, leading, and alignment.

    CIS.HS.9.3.e   Incorporate audio, visual, and graphic elements.

    CIS.HS.9.3.f   Develop a focused concept, clear methods of conveyance, and unified theme that solves the given problem.

    CIS.HS.9.3.g   Identify accessibility and standard compliance measures in order to communicate with a broad audience.

    CIS.HS.9.3.h   Explain design decisions in regards to themes.

    CIS.HS.9.3.i   Evaluate the impact of design decisions on the theme of a design.

    CIS.HS.9.3.j   Explain design and project goals using a storyboard, mock-up, and wireframes.

CIS.HS.9.4   **Analyze legal and ethical responsibilities.**

    CIS.HS.9.4.a   Apply copyright laws as appropriate in website and app creation.

    CIS.HS.9.4.b   Discuss security issues that are related to the utilization of the computer and/or Internet.

    CIS.HS.9.4.c   Describe situations where web pages and/or apps may be used unethically.

    CIS.HS.9.4.d   Describe licensing agreements.

    CIS.HS.9.4.e   Discuss the importance of creative commons.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | FOUNDATIONS OF WEB DESIGN

FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.5 **Create and test websites and/or apps designed for cross browser and mobile compatibility.**

CIS.HS.9.5.a   Utilize standards-compliant elements in code that delivers essential content and functionality if older browsers are not capable of displaying content.

CIS.HS.9.5.b   Create websites and/or apps that utilize responsive design to allow for a variety of screen sizes and geometries to view the content in a meaningful and logical fashion.

CIS.HS.9.5.c   Test an application on devices of varying geometries and operating system versions to ensure maximum compatibility.

CIS.HS.9.6 **Implement quality assurance processes to deliver effective digital communication.**

CIS.HS.9.6.a   Evaluate the website and/or app functionality.

CIS.HS.9.6.b   Test a website and/or app in a variety of environments.

CIS.HS.9.6.c   Evaluate site effectiveness through user search and accessibility to meet all audience needs.

CIS.HS.9.6.d   Investigate web hosts.

CIS.HS.9.6.e   Troubleshoot and maintain a website and/or app.

CIS.HS.9.6.f   Evaluate cross-browser compatibility.

CIS.HS.9.6.g   Identify the process of securing a domain name.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | FOUNDATIONS OF WEB DESIGN

FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.7   **Critique a website and/or app in accordance with web design principles.**

     CIS.HS.9.7.a   Assess download time.

     CIS.HS.9.7.b   Assess readability of the website and/or app.

     CIS.HS.9.7.c   Assess ease of navigation for both website and/or app.

     CIS.HS.9.7.d   Assess the design theme of a website and/or app.

     CIS.HS.9.7.e   Assess consistency of the theme across the entire website and/or app.

     CIS.HS.9.7.f   Assess the functionality of links.

CIS.HS.9.8   **Identify opportunities in an information technology career field including but not limited to entrepreneurial opportunities, responsibilities, education, and certification.**

     CIS.HS.9.8.a   Identify information technologies used in various industries.

     CIS.HS.9.8.b   Discuss the impact of technology on all career fields.

     CIS.HS.9.8.c   Identify common tasks in career fields.

     CIS.HS.9.8.d   Discuss career opportunities in information technology career fields.

     CIS.HS.9.8.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | FOUNDATIONS OF WEB DESIGN

BUSINESS COMMUNICATION

COURSE DESCRIPTION

Students will develop an understanding and appreciation for effective communication in business situations and environments. Emphasis is placed on all phases of communication: speaking, listening, thinking, responding, reading, writing, communicating non-verbally, and utilizing technology for communication.

STANDARDS AND INDICATORS:

BMM.HS.8.1   **Demonstrate reading skills in a variety of business-related activities.**

     BMM.HS.8.1.a   Demonstrate reading comprehension by restating or summarizing information.

     BMM.HS.8.1.b   Interpret and evaluate information from print and digital text features to support comprehension.

     BMM.HS.8.1.c   Interpret and evaluate information from professional resources and related documents (e.g., manuals, company policies, annual reports, reference materials).

BMM.HS.8.2   **Utilize active and attentive listening skills (e.g., eye contact, nonverbal cues, questioning, summarizing) for multiple situations and modalities (e.g., small/large group, presentation, one-to-one, digital).**

     BMM.HS.8.2.a   Integrate professional etiquette, techniques, and social protocols when communicating.

     BMM.HS.8.2.b   Follow multi step directions.

     BMM.HS.8.2.c   Identify barriers to listening.

     BMM.HS.8.2.d   Assess and respond to non-verbal communication as an active listener.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | BUSINESS COMMUNICATION

BUSINESS COMMUNICATION (cont.)

BMM.HS.8.3   **Create internal and external business correspondence to convey and obtain information effectively.**

    BMM.HS.8.3.a   Assess the nature of effective written communications.

    BMM.HS.8.3.b   Utilize appropriate formats for professional writing.

    BMM.HS.8.3.c   Compose, edit, and revise a variety of written work consistent with professional standards.

BMM.HS.8.4   **Apply skills and strategies for the delivery of effective oral communication.**

    BMM.HS.8.4.a   Assess the nature of effective verbal communications.

    BMM.HS.8.4.b   Match verbal and nonverbal messages (e.g., expression, tone, body language, gestures).

    BMM.HS.8.4.c   Demonstrate effective oral communication skills.

    BMM.HS.8.4.d   Demonstrate preparation and organization of thoughts before speaking (outline, notes).

BMM.HS.8.5   **Demonstrate technology and employability skills to enhance communication.**

    BMM.HS.8.5.a   Apply the critical-thinking and career readiness skills needed to function in multiple roles in business and communities.

    BMM.HS.8.5.b   Analyze legal and ethical issues in organizations and society.

    BMM.HS.8.5.c   Demonstrate the proper etiquette used in a professional setting (e.g., professional language, device usage, and privacy) and use of technology tools, such as voice mail, video conferencing, social media, messaging, and mobile devices.

    BMM.HS.8.5.d   Examine perspectives and opinions of diverse employees and how these factors impact communication.

    BMM.HS.8.5.e   Identify appropriate spoken and written actions when applying for and leaving a job.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | BUSINESS TECHNOLOGY | BUSINESS COMMUNICATION

FOUNDATIONS OF COMPUTING

COURSE DESCRIPTION

Foundations of Computing is designed for students who have never programmed before and serves as a starting point for Computer Science. Students will explore the impact of computing on society. Beyond learning the fundamentals of programming, students build computational-thinking skills by applying computer science to collaboration tools, modeling and simulation, and data analysis.

STANDARDS AND INDICATORS:

CIS.HS.8.1   Summarize computational problems.

CIS.HS.8.1.a   Identify component parts or subproblems of a simple problem.

CIS.HS.8.1.b   Identify subproblems that make up a larger computational problem.

CIS.HS.8.1.c   Explain how solutions to multiple subproblems work together to solve a larger problem.

CIS.HS.8.1.d   Define the term algorithm and explain its relationship to computational solutions.

CIS.HS.8.2   Develop and use abstractions in computational artifacts.

CIS.HS.8.2.a   Define abstraction in terms of computer science and provide an example of how abstraction is used to manage complexity.

CIS.HS.8.2.b   Represent equivalent data using different encoding schemes (e.g., binary, unicode, Morse code, student-created codes).

CIS.HS.8.2.c   Use abstraction to manage complexity or avoid duplication of effort.

CIS.HS.8.2.d   Use and extend existing procedures within a program based on their documentation.

CIS.HS.8.2.e   Identify repetitive elements of program code and develop functionally equivalent versions that reduce redundant code or hide the complexity of a task.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | FOUNDATIONS OF COMPUTING

FOUNDATIONS OF COMPUTING (cont.)

CIS.HS.8.3   **Create computational artifacts.**

> CIS.HS.8.3.a   Create variables to store data in a program.

> CIS.HS.8.3.b   Use and update data stored in variables.

> CIS.HS.8.3.c   Develop programs that use sequences of statements, loops, and conditional statements.

> CIS.HS.8.3.d   Design and develop computational artifacts that address personally- or socially relevant concerns.

CIS.HS.8.4   **Use data to understand and model real-world situations.**

> CIS.HS.8.4.a   Filter or transform data using a computational tool.

> CIS.HS.8.4.b   Explain the results of a data-driven investigation and a reproducible process for computing the results.

> CIS.HS.8.4.c   Use and modify a computer simulation to understand a real-world system.

> CIS.HS.8.4.d   Adjust inputs to an existing simulation to gain additional insights.

CIS.HS.8.5   **Test and iteratively refine computational solutions.**

> CIS.HS.8.5.a   Describe an iterative design process used in creating computational artifacts.

> CIS.HS.8.5.b   Apply an iterative design process to solve problems, both independently and collaboratively.

> CIS.HS.8.5.c   Locate and diagnose errors in program code.

> CIS.HS.8.5.d   Correct errors in program code.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | FOUNDATIONS OF COMPUTING

IT FUNDAMENTALS

COURSE DESCRIPTION

IT Fundamentals develops the students' abilities to analyze, evaluate, strategize, and reflect upon technologies such as computer hardware, computer software, web technologies, databases, networking, security, and software development. Students will also be introduced to ever-changing information technology careers along with developing positive and ethical behaviors/practices.

STANDARDS AND INDICATORS:

CIS.HS.12.1   Identify and describe the basic components of information technology.

| CIS.HS.12.1.a | Identify and distinguish the differences between input and output devices. |

CIS.HS.12.1.a   Identify and distinguish the differences between input and output devices.

CIS.HS.12.1.b   Identify and explain how various components meet the needs of the user.

CIS.HS.12.1.c   Identify and analyze emerging technologies.

CIS.HS.12.1.d   Identify storage options.

CIS.HS.12.1.e   Identify the process to configure permissions for files and folders.

CIS.HS.12.1.f   Explain multiple methods of moving digital files.

CIS.HS.12.2   Identify and analyze hardware components.

CIS.HS.12.2.a   Identify the correct hardware to connect with external components.

CIS.HS.12.2.b   Determine and evaluate recommended hardware devices to solve specific problems.

CIS.HS.12.2.c   Troubleshoot basic computer hardware problems.

CIS.HS.12.2.d   Find and analyze resources to answer basic troubleshooting questions.

CIS.HS.12.2.e   Develop criteria for purchasing or upgrading computer system hardware.

CIS.HS.12.2.f   Identify and analyze proper input technologies for various tasks.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | IT FUNDAMENTALS

IT FUNDAMENTALS (cont.)

CIS.HS.12.3   Identify and analyze software components.

CIS.HS.12.3.a   Identify and analyze software appropriate for specific tasks.

CIS.HS.12.3.b   Research and analyze software installation and upgrade options.

CIS.HS.12.3.c   Troubleshoot potential problems with software installation (i.e. bloatware).

CIS.HS.12.3.d   Compare and contrast the functions, features, and limitations of different operating systems and utilities (i.e.,open source and mobile proprietary operating systems).

CIS.HS.12.4   Explain web technologies.

CIS.HS.12.4.a   Identify the components (e.g., wires, cables, routers, etc.) that make up the Internet.

CIS.HS.12.4.b   Describe the types of Internet connections.

CIS.HS.12.4.c   Explain Transmission Control Protocol/Internet Protocol (TCP/IP).

CIS.HS.12.4.d   Identify and compare different types of web technologies: blogs, wikis, podcasts, RSS feeds, etc.

CIS.HS.12.4.e   Explain browser cache and the process of clearing it.

CIS.HS.12.5   Design, administer, and deploy networks.

CIS.HS.12.5.a   Define basic networking terminology.

CIS.HS.12.5.b   Describe the characteristics and uses of networks, network devices, and components.

CIS.HS.12.5.c   Identify the purpose of networks and their functionality.

CIS.HS.12.5.d   Identify tools, diagnostic procedures, and troubleshooting techniques for networks.

CIS.HS.12.5.e   Describe the process of configuring, optimizing, and upgrading of networks.

CIS.HS.12.5.f   Explore and use cloud computing.

CIS.HS.12.5.g   Research and analyze basic network security solutions.

CIS.HS.12.5.h   Design a theoretical network environment and create protocols on deploying and maintaining the network.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | IT FUNDAMENTALS

IT FUNDAMENTALS (cont.)

CIS.HS.12.6   Apply database management strategies.

CIS.HS.12.6.a   Design and create database tables and relationships.

CIS.HS.12.6.b   Create database columns and specify properties.

CIS.HS.12.6.c   Name tables and fields in conformance with naming conventions.

CIS.HS.12.6.d   Insert, update, and delete records in a database.

CIS.HS.12.6.e   Import data into databases and transfer data between databases.

CIS.HS.12.6.f   Organize and store database files in a structured environment for users.

CIS.HS.12.6.g   Control user access to data and log access to the database by user and type of transaction.

CIS.HS.12.6.h   Backup, verify, and recover data in a database.

CIS.HS.12.6.i   Generate and print forms, reports, and results of queries (i.e., calculated fields, functions).

CIS.HS.12.7   Design, develop, test, and implement programs.

CIS.HS.12.7.a   Identify and define programming terminology.

CIS.HS.12.7.b   Explain the importance of life-long learning as a programmer.

CIS.HS.12.7.c   Analyze the strengths and weaknesses of different languages for solving a specific problem.

CIS.HS.12.7.d   Write code that uses logical operators (e.g., and, or, not, loops).

CIS.HS.12.7.e   Write code that uses conditional control structures (e.g., if, if-then-else).

CIS.HS.12.7.f   Test and debug code.

CIS.HS.12.7.g   Identify and analyze protocols to maintain the integrity of programs.

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IT FUNDAMENTALS (cont.)

CIS.HS.12.8   Assess protocols for security and risk management.

CIS.HS.12.8.a   Identify the goals, objectives, and purposes of cybersecurity first principles.

CIS.HS.12.8.b   Identify different types of security threats and vulnerabilities.

CIS.HS.12.8.c   Identify and analyze policies procedures for security, privacy, and risk management.

CIS.HS.12.8.d   Explain intellectual property laws (e.g., copyright, trademark).

CIS.HS.12.8.e   Identify and analyze confidentiality concerns.

CIS.HS.12.8.f   Discuss risk loss and prevention methods.

CIS.HS.12.8.g   Analyze and evaluate passwords.

CIS.HS.12.8.h   Identify personal risks and create personal protocols to differentiate between home and work.

CIS.HS.12.9   Identify opportunities in an information technology career field.

CIS.HS.12.9.a   Identify information technologies used in various industries.

CIS.HS.12.9.b   Discuss the impact of technology on all career fields.

CIS.HS.12.9.c   Identify common tasks within the information technology career fields in occupations.

CIS.HS.12.9.d   Discuss career opportunities in information technology career fields.

CIS.HS.12.9.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | IT FUNDAMENTALS

COMPUTER SCIENCE PRINCIPLES

COURSE DESCRIPTION

Computer Science Principles introduces students to the foundations of computer science with a focus on how computing powers the world. Along with the fundamentals of computing, students will learn to analyze data, create technology that has a practical impact (addresses a real-world problem or need), and gain a broader understanding of how computer science impacts people and society.

STANDARDS AND INDICATORS:

CIS.HS.2.1   Identify and develop computational problems and solutions.

CIS.HS.2.1.a	Utilize user-centered research and a development process to create innovative software solutions.
CIS.HS.2.1.b	Describe the identified algorithms using foundational principles of sequence, iteration, and selection with "non-code" techniques (e.g., pseudo code, flow charts, and sequence diagrams).
CIS.HS.2.1.c	Analyze the difference between algorithms that run in a reasonable amount of time, those that do not run in a reasonable amount of time, and those that are not solvable with a computer.
CIS.HS.2.1.d	Identify patterns between previously-solved computational problems and new problem scenarios.
CIS.HS.2.1.e	Describe linear and binary search techniques and explain their appropriateness for a given data set.
CIS.HS.2.1.f	Design a solution to a computational problem as a team.
CIS.HS.2.1.g	Explain how collaboration impacts the development of a solution.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | COMPUTER SCIENCE PRINCIPLES

COMPUTER SCIENCE PRINCIPLES (cont.)

CIS.HS.2.2   **Construct abstractions in computational artifacts.**

CIS.HS.2.2.a	Define how the term abstraction is used within the field of computer science.
CIS.HS.2.2.b	Deconstruct a complex problem into distinct functional parts using predefined constructs of a programming language (e.g., functions, procedures, and methods).
CIS.HS.2.2.c	Develop procedures or functions that use parameters to generalize behaviors in a program.
CIS.HS.2.2.d	Create an abstraction of data in order to manage problem complexity (e.g., using a list instead of multiple discrete variables).
CIS.HS.2.2.e	Investigate the advantages of a given data abstraction over others to manage complexity and/or readability in a program.
CIS.HS.2.2.f	Explain how modeling and simulation can be used to explore natural phenomena.

CIS.HS.2.3   **Create computational artifacts.**

CIS.HS.2.3.a	Create programs that demonstrate concepts of sequence, selection, and iteration.
CIS.HS.2.3.b	Develop programs with nested loops and/or nested conditionals.
CIS.HS.2.3.c	Implement interactive programs that process user input and/or respond to events in the system.
CIS.HS.2.3.d	Develop programs that use lists or other collection types to hold or manage data.
CIS.HS.2.3.e	Integrate grade-level-appropriate mathematical techniques, concepts, and processes in the creation of computing artifacts.
CIS.HS.2.3.f	Analyze and interpret documentation for functions and use them as part of a computational artifact.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | COMPUTER SCIENCE PRINCIPLES

COMPUTER SCIENCE PRINCIPLES (cont.)

CIS.HS.2.4   Use data to understand and model real-world situations.

CIS.HS.2.4.a   Explain how abstractions on binary numbers are used to represent and store various kinds of data in computer systems (e.g., hexadecimal color codes, Unicode characters, audio, and videos).

CIS.HS.2.4.b   Convert numbers between binary, decimal, and hexadecimal.

CIS.HS.2.4.c   Analyze the tradeoffs among various representations of a type of digital information (e.g., lossy versus lossless compression, encrypted vs. unencrypted, various image representations).

CIS.HS.2.4.d   Describe techniques for extracting information from data and identify common challenges with data processing.

CIS.HS.2.4.e   Use a computational tool to collect, transform, and analyze data to gain new insights and knowledge from the data.

CIS.HS.2.5   Evaluate and interpret representations of algorithms.

CIS.HS.2.5.a   Predict the output/effect of a code segment or program.

CIS.HS.2.5.b   Explain how a code segment or program functions both verbally and in writing.

CIS.HS.2.5.c   Identify and correct errors in algorithms and programs, including error discovery through testing.

CIS.HS.2.5.d   Reason about diagrammatic representations of algorithms and logic expressions, including flow charts.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | COMPUTER SCIENCE PRINCIPLES

COMPUTER SCIENCE PRINCIPLES (cont.)

CIS.HS.2.6   **Explain how networks and computing systems work to transfer data.**

CIS.HS.2.6.a   Define basic components of computer networks.

CIS.HS.2.6.b   Explain how data is sent through the Internet via packets.

CIS.HS.2.6.c   Describe properties of redundancy and fault tolerance in systems/networks like the Internet.

CIS.HS.2.6.d   Differentiate between sequential, parallel, and distributed computing approaches.

CIS.HS.2.7   **Analyze the social impacts of technology and describe ethical IT practices.**

CIS.HS.2.7.a   Interpret potential beneficial and harmful effects of computing innovations.

CIS.HS.2.7.b   Explain multiple causes for the digital divide and its impacts on society.

CIS.HS.2.7.c   Describe how algorithms may result in both intentional and unintentional bias.

CIS.HS.2.7.d   Investigate how computing innovations can have legal and ethical implications.

CIS.HS.2.7.e   Identify safe computing practices and how they address common vulnerabilities.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | COMPUTER SCIENCE PRINCIPLES

COMPUTER SCIENCE A

COURSE DESCRIPTION

"Computer Science A introduces students to computer science through programming. Fundamental topics in this course include the design of solutions to problems, the use of data structures to organize large sets of data, the development and implementation of algorithms to process data and discover new information, the analysis of potential solutions, and the ethical and social implications of computing systems. The course emphasizes object-oriented programming and design".

-College Board, 2020, Page 7

STANDARDS AND INDICATORS:

CIS.HS.3.1   Define a computational problems and solve it.

CIS.HS.3.1.a	Define examples of computationally solvable problems and difficult-to-solve problems.
CIS.HS.3.1.b	Decompose a large-scale computational problem by identifying generalizable patterns.
CIS.HS.3.1.c	Determine code that would be used to complete code segments.
CIS.HS.3.1.d	Determine the efficiency of a program.

CIS.HS.3.2   Interpret existing code written with the Advanced Placement language subset.

CIS.HS.3.2.a	Determine the result or output of code execution, including code with and without method or function calls.
CIS.HS.3.2.b	Evaluate logical expressions to determine their resulting values.
CIS.HS.3.2.c	Predict the output of code that uses collections and multidimensional collections of data.
CIS.HS.3.2.d	Trace code involving hierarchies of classes to demonstrate how inheritance influences program behavior.
CIS.HS.3.2.e	Interpret documentation and/or a program description in order to write code that satisfies all conditions and requirements described.
CIS.HS.3.2.f	Explain common errors that will occur in given erroneous examples (e.g. null pointers, bounds exceptions, arithmetic errors, logic errors, stack overflows).
CIS.HS.3.2.g	Define recursion and diagram the behavior of a recursive function.

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COMPUTER SCIENCE A (cont.)

CIS.HS.3.3 **Write and implement program code with the AP language subset.**

  CIS.HS.3.3.a Develop programs involving statements, logical expressions, conditionals, and iteration to satisfy design specifications.

  CIS.HS.3.3.b Process user input using an appropriate technique to solve a problem.

  CIS.HS.3.3.c Represent nested iterative and branching logical processes by using appropriate control structures.

  CIS.HS.3.3.d Write programs that organize and manipulate data in collections and multidimensional collections in order to solve a problem.

  CIS.HS.3.3.e Resolve errors in code using compiler and run-time error messages.

CIS.HS.3.4 **Model real-world situations using data.**

  CIS.HS.3.4.a Select appropriate data types for variables based on the needs of the problem.

  CIS.HS.3.4.b Convert extracted data to the appropriate data type for computation or storage (e.g., type casting, parsing, etc.).

  CIS.HS.3.2.c Manage numeric data types in calculations to account for floating point error and loss of precision.

  CIS.HS.3.4.d Extract relevant information from a string of text using parsing techniques within a program.

  CIS.HS.3.4.e Apply data sorting and searching algorithms in different contexts.

  CIS.HS.3.4.f Write a program that uses data analysis techniques to identify significant patterns in complex systems.

  CIS.HS.3.4.g Justify which collection type is appropriate for a given problem.

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COMPUTER SCIENCE A (cont.)

CIS.HS.3.5   Develop and use abstractions in programs to promote code modularity

CIS.HS.3.5.a   Create programs using standard language-specific libraries including those explicitly identified in the Advanced Placement language subset.

CIS.HS.3.5.b   Evaluate procedural abstractions in terms of properties like efficiency, correctness, and readability.

CIS.HS.3.5.c   Define basic object-oriented concepts of encapsulation and information hiding and explain how they promote modularity.

CIS.HS.3.5.d   Implement object-oriented computer programs containing multiple student-designed classes.

CIS.HS.3.5.e   Explain is-a and has-a relationships between different data types and give examples of where each could be used within a program.

CIS.HS.3.5.f   Devise an algorithm that models a real-world phenomenon and implement it in code.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | COMPUTER SCIENCE A

SOFTWARE DEVELOPMENT

COURSE DESCRIPTION

Software Development is intended as a integrative course in computer science and engineering programs of study. It is a research, design, and development course in which students work in groups to design, develop, and deploy an original solution to a valid, open-ended technical problem by applying a software lifecycle process. The course applies and concurrently develops secondary-level knowledge and skills in mathematics, science, technology, and other related areas.

STANDARDS AND INDICATORS:

CIS.HS.16.1   **Define computational problems and solutions.**

> CIS.HS.16.1.a   Employ user-centered research techniques to investigate the needs of one or more stakeholder groups.

> CIS.HS.16.1.b   Identify and design multiple potential computational solutions to a given problem.

CIS.HS.16.2   **Develop abstractions in computational artifacts.**

> CIS.HS.16.2.a   Design and evaluate the components of computational solution to an identified problem.

> CIS.HS.16.2.b   Use functional decomposition techniques to develop the framework for a computational solution.

> CIS.HS.16.2.c   Critique similar solutions or existing components of a solution to problems that have the potential for reuse in a new solution.

CIS.HS.16.3   **Create computational artifacts as part of a team.**

> CIS.HS.16.3.a   Apply knowledge of computational tools and programming language(s) to select components needed to implement a solution for a user audience.

> CIS.HS.16.3.b   Integrate computational components into a solution to the identified problem.

> CIS.HS.16.3.c   Use version control systems, integrated development environments (IDEs), and collaborative tools and practices (code documentation) in a group software project.

> CIS.HS.16.3.d   Define the components and structure of a standard software lifecycle process (e.g., waterfall, spiral, agile).

> CIS.HS.16.3.e   Demonstrate software lifecycle processes while participating on software project teams.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | SOFTWARE DEVELOPMENT

SOFTWARE DEVELOPMENT (cont.)

CIS.HS.16.4   Test computational solutions.

CIS.HS.16.4.a   Develop a series of test cases to verify that a program performs according to its design specifications.

CIS.HS.16.4.b   Evaluate programs using debugging techniques and test cases to ensure correctness of code.

CIS.HS.16.4.c   Determine appropriate data collection techniques and use them to evaluate the usability, functionality, and user experience of a computational solution with stakeholders.

CIS.HS.16.4.d   Use evidence and prioritize additional features and defects that should be addressed in subsequent development cycles.

CIS.HS.16.5   Apply social and ethical impacts of computing.

CIS.HS.16.5.a   Identify potential threats or unintended consequences of the current iteration of a software solution.

CIS.HS.16.5.b   Justify how the current version of a solution guards against external threats, bias, malicious uses, or unintended consequences.

CIS.HS.16.5.c   Compare and contrast various software licensing schemes (e.g., open source, freeware, commercial).

CIS.HS.16.5.d   Evaluate licenses that limit or restrict use of computational artifacts when reusing code or using resources such as libraries.

CIS.HS.16.5.e   Justify an appropriate software licensing scheme for a particular computational artifact.

CIS.HS.16.5.f   Demonstrate ethical attribution and adherence to applicable intellectual property licensing while using third party resources in a software solution.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | SOFTWARE DEVELOPMENT

SOFTWARE DEVELOPMENT (cont.)

CIS.HS.16.6   Communicate about computational artifacts and computational understandings.

CIS.HS.16.6.a   Develop and deploy a communication plan to communicate project progress with external stakeholders.

CIS.HS.16.6.b   Provide justifications for design decisions and the effect they will have on the final product.

CIS.HS.16.6.c   Present periodic updates on the development process to classmates and other stakeholders.

CIS.HS.16.6.d   Evaluate key qualities of a program through a process such as a code review.

CIS.HS.16.6.e   Communicate the final outcomes of the software solution, development process, intended use, and future development plans using an appropriate modality (e.g., portfolios, presentations).

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | COMPUTER SCIENCE | SOFTWARE DEVELOPMENT

INFORMATION TECHNOLOGY APPLICATIONS II

COURSE DESCRIPTION

This course will focus on skill development in data science using word processing, spreadsheets, databases, and integration of applications utilizing advanced features. Students taking both Information Technology Applications I and II may be eligible for dual credit at a participating postsecondary institution. Skills, standards, and coursework align with industry certifications.

STANDARDS AND INDICATORS:

CIS.HS.11.1   Organize, aggregate, and manipulate data using advanced word processing features.

CIS.HS.11.1.a   Integrate other program files into word processing documents (insert, embed, and link).

CIS HS.11.1.b   Create and format tables using advanced features (formulas, styles).

CIS HS.11.1.c   Use advanced merge features to integrate spreadsheet and database information into the word processing document as fields and records.

CIS.HS.11.1.d   Create and manage styles.

CIS.HS.11.1.e   Plan, record, run, and edit Macros.

CIS.HS.11.2   Organize, aggregate, and manipulate data using advanced spreadsheet features.

CIS.HS.11.2.a   Create worksheet structures using formulas and advanced features. (e.g., logical statements, vLookup, financial, statistical functions, and named ranges).

CIS.HS.11.2.b   Interpret data through statistical analysis (e.g., sorting, filtering, forecasting, and pivot tables).

CIS.HS.11.2.c   Import, export, and share worksheet data.

CIS.HS.11.2.d   Customize formatting methods, including conditional formatting and other advanced formatting methods.

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INFORMATION TECHNOLOGY APPLICATIONS II (cont.)

CIS.HS.11.3   **Synthesize relational database concepts to design, manage, evaluate, and organize information.**

> CIS.HS.11.3.a   Design tables specifying properties for data entry and relationships.
>
> CIS.HS.11.3b   Construct multi-table queries to retrieve, organize, and aggregate data to draw conclusions.
>
> CIS.HS.11.3.c   Design forms and subforms for efficient and effective data entry or retrieval.
>
> CIS.HS.11.3.d   Design reports and subreports utilizing tables, graphs, sparklines, and pivot tables for displaying meaningful data.
>
> CIS.HS.11.3.e   Analyze relational data using Structure Query Language (SQL).

CIS.HS.11.4   **Consider the relationship between different programs to utilize data in one program to the next to create new documents.**

> CIS.HS.11.4.a   Utilize spreadsheets, presentation, and database information in word processing documents.
>
> CIS.HS.11.4.b   Utilize word processing, presentation, and database information in a spreadsheet.
>
> CIS.HS.11.4.c   Utilize word processing, spreadsheet, and database information in a presentation.
>
> CIS.HS.11.4.d   Utilize word processing and spreadsheet information in a database.

CIS.HS.11.5   **Describe the importance of ethical data collection and applicable conclusions.**

> CIS.HS.11.5.a   Analyze the privacy practices of data collection and use.
>
> CIS.HS.11.5.b   Analyze the security practices of data collection and use.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DATA ANALYTICS & MANAGEMENT | IT APPLICATIONS 2

INFORMATION TECHNOLOGY APPLICATIONS II (cont.)

CIS.HS.11.6   **Demonstrate critical thinking skills to integrate information technology tools to access, manage, and create new information.**

> CIS.HS.11.6.a   Gather, evaluate, use, and disseminate information from multiple technology sources.

> CIS.HS.11.6.b   Create purposeful, digitally designed products (e.g., brochure, presentation, website, portfolio).

CIS.HS.11.7   **Identify opportunities in an information technology career field including but not limited to entrepreneurial opportunities, responsibilities, education, and certification.**

> CIS.HS.11.7.a   Identify information technologies used in various industries.

> CIS.HS.11.7.b   Discuss the impact of technology on all career fields.

> CIS.HS 11.7.c   Identify common tasks in career fields.

> CIS.HS 11.7.d   Discuss career opportunities in information technology career fields.

> CIS.HS.11.7.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

> CIS.HS.11.7.f   Identify the benefits of industry certification and higher education programs.

> CIS.HS.11.7.g   Identify the necessary skills to succeed in fields using data science.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DATA ANALYTICS & MANAGEMENT | IT APPLICATIONS 2

DATA LITERACY AND VISUALIZATION

COURSE DESCRIPTION

This course provides an introduction to data literacy and visualization. The course focuses on practical applications of data analysis to give students concrete and applicable skills. Students will learn how to ask and answer questions with data and communicate the results to various audiences. The course also emphasizes the ethical implications of data collection and use.

STANDARDS AND INDICATORS:

CIS.HS.5.1   Collect and describe data.

CIS.HS.5.1.a	List and give examples of data types/formats (e.g., ordinal, ratio/interval, categorical, text, images).
CIS.HS.5.1.b	Recognize and define diverse sources of data.
CIS.HS.5.1.c	Identify ethical issues with data collection.
CIS.HS.5.1.d	Summarize a data set including properties of the data.
CIS.HS.5.1.e	Recognize outliers in data.
CIS.HS.5.1.f	Demonstrate appropriate course of action to handle outliers in data.
CIS.HS.5.1.g	Identify issues of representation in data and data collection, including sampling bias within broader populations.
CIS.HS.5.1.h	Describe distributions and Identify common shapes of data plots (e.g., normal curve, poisson).

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DATA ANALYTICS & MANAGEMENT | DATA LITERACY & VISUALIZATION

DATA LITERACY AND VISUALIZATION (cont.)

CIS.HS.5.2   Analyze data

CIS.HS.5.2.a   Transform raw data from one form to another (e.g., numeric data to categorical).

CIS.HS.5.2.b   Explain and compute appropriate summary data statistics for the data.

CIS.HS.5.2.c   Use computational tools to explore relationships between variables using basic inferential statistics (e.g., correlation, t-tests, chi square).

CIS.HS.5.2.d   Identify the appropriate analysis to answer a question using data.

CIS.HS.5.2.e   Merge related data sets.

CIS.HS.5.3   Interpret data to provide greater understanding of information.

CIS.HS.5.3.a   Use results of data analysis to answer questions.

CIS.HS.5.3.b   Explain the results of a statistical analysis in light of the context of the data.

CIS.HS.5.3.c   Form and justify conclusions derived from data analysis.

CIS.HS.5.3.d   Identify threats to the interpretation of data analysis (e.g., validity, reliability, overgeneralization).

CIS.HS.5.4   Communicate data and results of analysis

CIS.HS.5.4.a   Recognize and define the elements of effective data display.

CIS.HS.5.4.b   Analyze multiple methods of representing data and justify how a representation effectively communicates a result to an intended audience.

CIS.HS.5.4.c   Use software tools to create effective visualizations of data (e.g., heat maps, scatter plots, radial graphs, etc.).

CIS.HS.5.4.d   Communicate results of data analysis to stakeholders and other audiences.

CIS.HS.5.4.e   Identify misconceptions that may arise from alternate visualizations/ representations of data.

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DATA LITERACY AND VISUALIZATION (cont.)

CIS. HS 5.5   Describe how data can be used to create value for organizations and individuals.

CIS.HS.5.5.a   Identify questions that can be asked from a data set and, given a question, identify what data is needed to answer the question.

CIS.HS.5.5.b   Explain the implications of data analysis in making strategic decisions.

CIS.HS.5.5.c   Identify ethical issues with how data is collected and stored.

CIS.HS.5.5.d   Describe the difference between data privacy and data security, and how to protect both.

CIS.HS.5.5.e   Explain how data transparency can lead to replicability and identify potential concerns regarding sharing data.

CIS.HS.5.5.f   Identify how organizations collect data and meta-data and the implications for individual privacy and for organizational value.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DATA ANALYTICS & MANAGEMENT | DATA LITERACY &VISUALIZATION

INTRODUCTION TO DATA SCIENCE

COURSE DESCRIPTION

This course introduces data science concepts and skills at the intersection of data analysis, computer and information sciences, and mathematics. Students will work with large, real-world datasets, deploy statistical modeling techniques to make predictions based on that data, and communicate the results of their analyses. The course also critically considers the societal applications, implications, and ethics of data science.

STANDARDS AND INDICATORS:

CIS.HS.13.1   Acquire, Store, and Clean Data.

CIS.HS.13.1.a	Implement diverse methods of collecting data and recognize the implications of each method.
CIS.HS.13.1.b	Identify reliable sources of public data and use the data from them.
CIS.HS.13.1.c	Apply appropriate data cleaning techniques to handle messy data (e.g., missing values, errors, heterogeneous values, outliers, etc.).
CIS.HS.13.1.d	Determine potential ethical implications of various sources and forms of data acquisition (e.g,. Segmentation and demographic-based targeting).
CIS.HS.13.1.e	Organize data using a software tool for later retrieval and/or analysis (e.g., relational databases).
CIS.HS.13.1.f	Manipulate data to facilitate analysis (e.g., subset, reshape, classify).

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DATA ANALYTICS & MANAGEMENT | INTRO TO DATA SCIENCE

INTRODUCTION TO DATA SCIENCE (cont.)

CIS.HS.13.2   Create models and draw statistical inferences from data.

CIS.HS.13.2.a   Transform raw data into actionable results (e.g., scoring and ranking).

CIS.HS.13.2.b   Use computational tools to understand and model the relationships between multiple variables.

CIS.HS.13.2.c   Use data to predict future observations.

CIS.HS.13.2.d   Analyze large and/or unstructured data.

CIS.HS.13.2.e   Explain the basic mechanics of clustering algorithms and supervised/unsupervised learning from data.

CIS.HS.13.3   Evaluate the results of data analysis.

CIS.HS.13.3.a   Generate and test hypotheses.

CIS.HS.13.3.b   Evaluate the outcomes of data predictions.

CIS.HS.13.3.c   Draw and justify conclusions using inferential analysis of data.

CIS.HS.13.3.d   Make recommendations for future action based on the results of data analysis.

CIS.HS.13.3.e   Identify flaws or limitations in the results of data analysis and their implications.

CIS.HS.13.4   Represent and communicate data and results of analysis.

CIS.HS.13.4.a   Use computational tools to generate effective data visualizations, including spatial data.

CIS.HS.13.4.b   Derive meaning from and summarize interactive visualizations of data.

CIS.HS.13.4.c   Justify the efficacy of different visualizations for communicating data.

CIS.HS.13.4.d   Analyze statistical representations to identify patterns and develop insight about data.

CIS.HS.13.4.e   Communicate results of data analysis to various audiences.

CIS.HS.13.4.f   Create and interpret visualizations of real-world processes as captured by data.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DATA ANALYTICS & MANAGEMENT | INTRO TO DATA SCIENCE

INTRODUCTION TO DATA SCIENCE (cont.)

CIS.HS.13.5   **Explain the ethics and societal implications of data.**

CIS.HS.13.5.a	Explain ways in which data use and analysis can benefit or threaten organizations and society.
CIS.HS.13.5.b	Describe applications and implications of artificial intelligence and automated decision making in society.
CIS.HS.13.5.c	Identify ethical and legal issues in data collection, handling, use, and retention (e.g., the CIA Triad, human subjects data, HIPAA, etc.).
CIS.HS.13.5.d	Assess tradeoffs between individual privacy and organizational/societal value arising from large-scale data collection and analysis.
CIS.HS.13.5.e	Discuss the implications of algorithmic bias and automated inequality on society.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | DATA ANALYTICS & MANAGEMENT | INTRO TO DATA SCIENCE

IT FUNDAMENTALS

COURSE DESCRIPTION

IT Fundamentals develops the students' abilities to analyze, evaluate, strategize, and reflect upon technologies such as computer hardware, computer software, web technologies, databases, networking, security, and software development. Students will also be introduced to ever-changing information technology careers along with developing positive and ethical behaviors/practices.

STANDARDS AND INDICATORS:

CIS.HS.12.1   Identify and describe the basic components of information technology.

CIS.HS.12.1.a	Identify and distinguish the differences between input and output devices.
CIS.HS.12.1.b	Identify and explain how various components meet the needs of the user.
CIS.HS.12.1.c	Identify and analyze emerging technologies.
CIS.HS.12.1.d	Identify storage options.
CIS.HS.12.1.e	Identify the process to configure permissions for files and folders.
CIS.HS.12.1.f	Explain multiple methods of moving digital files.

CIS.HS.12.2   Identify and analyze hardware components.

CIS.HS.12.2.a	Identify the correct hardware to connect with external components.
CIS.HS.12.2.b	Determine and evaluate recommended hardware devices to solve specific problems.
CIS.HS.12.2.c	Troubleshoot basic computer hardware problems.
CIS.HS.12.2.d	Find and analyze resources to answer basic troubleshooting questions.
CIS.HS.12.2.e	Develop criteria for purchasing or upgrading computer system hardware.
CIS.HS.12.2.f	Identify and analyze proper input technologies for various tasks.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | IT FUNDAMENTALS

IT FUNDAMENTALS (cont.)

CIS.HS.12.3   **Identify and analyze software components.**

CIS.HS.12.3.a   Identify and analyze software appropriate for specific tasks.

CIS.HS.12.3.b   Research and analyze software installation and upgrade options.

CIS.HS.12.3.c   Troubleshoot potential problems with software installation (i.e. bloatware).

CIS.HS.12.3.d   Compare and contrast the functions, features, and limitations of different operating systems and utilities (i.e.,open source and mobile proprietary operating systems).

CIS.HS.12.4   **Explain web technologies.**

CIS.HS.12.4.a   Identify the components (e.g., wires, cables, routers, etc.) that make up the Internet.

CIS.HS.12.4.b   Describe the types of Internet connections.

CIS.HS.12.4.c   Explain Transmission Control Protocol/Internet Protocol (TCP/IP).

CIS.HS.12.4.d   Identify and compare different types of web technologies: blogs, wikis, podcasts, RSS feeds, etc.

CIS.HS.12.4.e   Explain browser cache and the process of clearing it.

CIS.HS.12.5   **Design, administer, and deploy networks.**

CIS.HS.12.5.a   Define basic networking terminology.

CIS.HS.12.5.b   Describe the characteristics and uses of networks, network devices, and components.

CIS.HS.12.5.c   Identify the purpose of networks and their functionality.

CIS.HS.12.5.d   Identify tools, diagnostic procedures, and troubleshooting techniques for networks.

CIS.HS.12.5.e   Describe the process of configuring, optimizing, and upgrading of networks.

CIS.HS.12.5.f   Explore and use cloud computing.

CIS.HS.12.5.g   Research and analyze basic network security solutions.

CIS.HS.12.5.h   Design a theoretical network environment and create protocols on deploying and maintaining the network.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | IT FUNDAMENTALS

IT FUNDAMENTALS (cont.)

CIS.HS.12.6   Apply database management strategies.

CIS.HS.12.6.a   Design and create database tables and relationships.

CIS.HS.12.6.b   Create database columns and specify properties.

CIS.HS.12.6.c   Name tables and fields in conformance with naming conventions.

CIS.HS.12.6.d   Insert, update, and delete records in a database.

CIS.HS.12.6.e   Import data into databases and transfer data between databases.

CIS.HS.12.6.f   Organize and store database files in a structured environment for users.

CIS.HS.12.6.g   Control user access to data and log access to the database by user and type of transaction.

CIS.HS.12.6.h   Backup, verify, and recover data in a database.

CIS.HS.12.6.i   Generate and print forms, reports, and results of queries (i.e., calculated fields, functions).

CIS.HS.12.7   Design, develop, test, and implement programs.

CIS.HS.12.7.a   Identify and define programming terminology.

CIS.HS.12.7.b   Explain the importance of life-long learning as a programmer.

CIS.HS.12.7.c   Analyze the strengths and weaknesses of different languages for solving a specific problem.

CIS.HS.12.7.d   Write code that uses logical operators (e.g., and, or, not, loops).

CIS.HS.12.7.e   Write code that uses conditional control structures (e.g., if, if-then-else).

CIS.HS.12.7.f   Test and debug code.

CIS.HS.12.7.g   Identify and analyze protocols to maintain the integrity of programs.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | IT FUNDAMENTALS

IT FUNDAMENTALS (cont.)

CIS.HS.12.8   **Assess protocols for security and risk management.**

CIS.HS.12.8.a   Identify the goals, objectives, and purposes of cybersecurity first principles.

CIS.HS.12.8.b   Identify different types of security threats and vulnerabilities.

CIS.HS.12.8.c   Identify and analyze policies procedures for security, privacy, and risk management.

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CIS.HS.12.8.d   Explain intellectual property laws (e.g., copyright, trademark).

CIS.HS.12.8.e   Identify and analyze confidentiality concerns.

CIS.HS.12.8.f   Discuss risk loss and prevention methods.

CIS.HS.12.8.g   Analyze and evaluate passwords.

CIS.HS.12.8.h   Identify personal risks and create personal protocols to differentiate between home and work.

CIS.HS.12.9   **Identify opportunities in an information technology career field.**

CIS.HS.12.9.a   Identify information technologies used in various industries.

CIS.HS.12.9.b   Discuss the impact of technology on all career fields.

CIS.HS.12.9.c   Identify common tasks within the information technology career fields in occupations.

CIS.HS.12.9.d   Discuss career opportunities in information technology career fields.

CIS.HS.12.9.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | IT FUNDAMENTALS

INFORMATION TECHNOLOGY APPLICATIONS II

COURSE DESCRIPTION

This course will focus on skill development in data science using word processing, spreadsheets, databases, and integration of applications utilizing advanced features. Students taking both Information Technology Applications I and II may be eligible for dual credit at a participating postsecondary institution. Skills, standards, and coursework align with industry certifications.

STANDARDS AND INDICATORS:

CIS.HS.11.1   Organize, aggregate, and manipulate data using advanced word processing features.

CIS.HS.11.1.a   Integrate other program files into word processing documents (insert, embed, and link).

CIS HS.11.1.b   Create and format tables using advanced features (formulas, styles).

CIS HS.11.1.c   Use advanced merge features to integrate spreadsheet and database information into the word processing document as fields and records.

CIS.HS.11.1.d   Create and manage styles.

CIS.HS.11.1.e   Plan, record, run, and edit Macros.

CIS.HS.11.2   Organize, aggregate, and manipulate data using advanced spreadsheet features.

CIS.HS.11.2.a   Create worksheet structures using formulas and advanced features. (e.g., logical statements, vLookup, financial, statistical functions, and named ranges).

CIS.HS.11.2.b   Interpret data through statistical analysis (e.g., sorting, filtering, forecasting, and pivot tables).

CIS.HS.11.2.c   Import, export, and share worksheet data.

CIS.HS.11.2.d   Customize formatting methods, including conditional formatting and other advanced formatting methods.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | IT APPLICATIONS 2

INFORMATION TECHNOLOGY APPLICATIONS II (cont.)

CIS.HS.11.3   Synthesize relational database concepts to design, manage, evaluate, and organize information.

> CIS.HS.11.3.a   Design tables specifying properties for data entry and relationships.

> CIS.HS.11.3b   Construct multi-table queries to retrieve, organize, and aggregate data to draw conclusions.

> CIS.HS.11.3.c   Design forms and subforms for efficient and effective data entry or retrieval.

> CIS.HS.11.3.d   Design reports and subreports utilizing tables, graphs, sparklines, and pivot tables for displaying meaningful data.

> CIS.HS.11.3.e   Analyze relational data using Structure Query Language (SQL).

CIS.HS.11.4   Consider the relationship between different programs to utilize data in one program to the next to create new documents.

> CIS.HS.11.4.a   Utilize spreadsheets, presentation, and database information in word processing documents.

> CIS.HS.11.4.b   Utilize word processing, presentation, and database information in a spreadsheet.

> CIS.HS.11.4.c   Utilize word processing, spreadsheet, and database information in a presentation.

> CIS.HS.11.4.d   Utilize word processing and spreadsheet information in a database.

CIS.HS.11.5   Describe the importance of ethical data collection and applicable conclusions.

> CIS.HS.11.5.a   Analyze the privacy practices of data collection and use.

> CIS.HS.11.5.b   Analyze the security practices of data collection and use.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | IT APPLICATIONS 2

INFORMATION TECHNOLOGY APPLICATIONS II (cont.)

CIS.HS.11.6   **Demonstrate critical thinking skills to integrate information technology tools to access, manage, and create new information.**

> CIS.HS.11.6.a   Gather, evaluate, use, and disseminate information from multiple technology sources.

> CIS.HS.11.6.b   Create purposeful, digitally designed products (e.g., brochure, presentation, website, portfolio).

CIS.HS.11.7   **Identify opportunities in an information technology career field including but not limited to entrepreneurial opportunities, responsibilities, education, and certification.**

> CIS.HS.11.7.a   Identify information technologies used in various industries.

> CIS.HS.11.7.b   Discuss the impact of technology on all career fields.

> CIS.HS 11.7.c   Identify common tasks in career fields.

> CIS.HS 11.7.d   Discuss career opportunities in information technology career fields.

> CIS.HS.11.7.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

> CIS.HS.11.7.f   Identify the benefits of industry certification and higher education Programs.

> CIS.HS.11.7.g   Identify the necessary skills to succeed in fields using data science.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | IT APPLICATIONS 2

CYBERSECURITY

COURSE DESCRIPTION

This is a survey course that explores fundamental knowledge and skills in the field of cybersecurity. Topics explored include cryptography, software and network vulnerabilities, governance, global impacts, and career fields in information assurance.

STANDARDS AND INDICATORS:

CIS.HS.4.1   **Analyze classic and modern approaches to cryptography and cryptanalysis.**

CIS.HS.4.1.a   Describe the historical evolution of cryptography, encryption, and ciphers.

CIS.HS.4.1.b   Explain the use of and mechanics behind public key encryption.

CIS.HS.4.1.c   Demonstrate how common cipher algorithms operate on sample data.

CIS.HS.4.1.d   Compare and contrast modern cryptographic techniques used to protect information in industry and government.

CIS.HS.4.1.e   Describe vulnerabilities of common cipher algorithms and demonstrate cryptanalysis techniques to decrypt messages based on these vulnerabilities.

CIS.HS.4.2   **Analyze the core components of network systems, including the internet, relative to network security concerns.**

CIS.HS.4.2.a   Differentiate between layers in the Open Systems Interconnection (OSI) model and explain how they work together to transmit data in networks.

CIS.HS.4.2.b   Analyze potential indicators and metrics associated with common network attacks (e.g., rogue wireless access points, man-in-the-middle, DNS poisoning, DDos, Malicious code execution, etc.).

CIS.HS.4.2.c   Propose a secure network architecture in response to a hypothetical scenario or set of design constraints (e.g. network segmentation, load balancing, network system access control, port security, wireless protocol configuration, etc.).

CIS.HS.4.2.d   Summarize virtualization and cloud computing concepts and describe how Internet of Things devices work.

CIS.HS.4.2.e   Use network reconnaissance and discovery tools to identify the properties and vulnerabilities of a network.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | CYBERSECURITY

CYBERSECURITY (cont.)

CIS.HS.4.3   **Explain the role of software in cybersecurity, including techniques to protect local host computers.**

     CIS.HS.4.3.a   Explain the role of patching and software updates in reducing risk and compare the advantages and disadvantages of different patching strategies.

     CIS.HS.4.3.b   Propose and justify operating system configuration settings and policies to minimize security risks.

     CIS.HS.4.3.c   Analyze the tension between security and usability in software systems and describe how to minimize the impact of security policies on user experience.

     CIS.HS.4.3.d   Describe how scripting or other forms of automation are used to facilitate cyber attacks.

     CIS.HS.4.3.e   Identify abnormal indicators of software or computer performance that suggest the presence of a system attack or exploit.

CIS.HS.4.4   **Identify and analyze applicable laws and policies, including principles of governance, risk, and compliance.**

     CIS.HS.4.4.a   Analyze how social and cultural norms are mutually shaped by security policies and how this impacts both individuals and organizations.

     CIS.HS.4.4.b   Compare and contrast federal, state, local, and international cyber laws and regulations for individuals and businesses.

     CIS.HS.4.4.c   Illustrate examples of how local government decisions can impact global cybersecurity considerations.

     CIS.HS.4.4.d   Summarize risk management processes and concepts. (e.g., the NIST Cybersecurity Framework concepts identify, protect, detect, respond, recover).

     CIS.HS.4.4.e   Analyze the security policy of an enterprise environment and recommend appropriate security solutions.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | CYBERSECURITY

CYBERSECURITY (cont.)

CIS.HS.4.5   Distinguish between data security concerns and practices.

CIS.HS.4.5.a   Explain various interactions between confidentiality, integrity, and availability (i.e., "the CIA triad") for data in use, at rest, and in motion.

CIS.HS.4.5.b   Explain the extent of individuals' digital footprints and discuss the potential implications thereof.

CIS.HS.4.5.c   Determine and evaluate levels of access for various data classifications (e.g. confidential, private, public, sensitive, critical, proprietary).

CIS.HS.4.5.d   Compare the advantages and tradeoffs of multiple authentication strategies.

CIS.HS.4.6   Identify threats, vulnerabilities and attacks that may be present in computing systems and assess their potential impacts on society.

CIS.HS.4.6.a   Identify and differentiate between the different threat actors, vectors, and intelligence sources.

CIS.HS.4.6.b   Identify and differentiate between the types of malware, web-based, and network attacks.

CIS.HS.4.6.c   Categorize types of attacks and remedies based on their underlying similarities and differences.

CIS.HS.4.6.d   Analyze system vulnerabilities, exploits, and payloads on a network (e.g. from MITRE ATT&CK® Framework), and describe potential countermeasures.

CIS.HS.4.6.e   Explain how social engineering can be used to compromise individuals and organizations.

CIS.HS.4.5   Distinguish between data security concerns and practices.

CIS.HS.4.7.a   Identify the role and responsibilities of cybersecurity professionals in diverse industries.

CIS.HS.4.7.b   Map education and certification requirements to different cybersecurity careers.

CIS.HS.4.7.c   Describe the impact of technological change and the importance of lifelong learning in a cybersecurity career.

CIS.HS.4.7.d   Recognize the role of cybersecurity awareness in a multitude of careers.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | CYBERSECURITY

NETWORKING

COURSE DESCRIPTION

This course is a study of the networking fundamentals in regards to managing home and corporate network systems and protocols. Students will design, plan, implement, and support computer networks. Students will also enhance problem solving, critical thinking, and analytical skills throughout this course.

STANDARDS AND INDICATORS:

CIS.HS.15.1   Explain network terminology and components.

CIS.HS.15.1.a	Define and analyze the abilities and features of a client.
CIS.HS.15.1.b	Define and analyze abilities and features of a server.
CIS.HS.15.1.c	Identify client and server functions.
CIS.HS.15.1.d	Describe how the Internet communicates through internet protocols and packets.
CIS.HS.15.1.e	Describe how routers work and how data routing helps to make the internet fault tolerant.

CIS.HS.15.2   Establish routines and procedures appropriate for network management.

CIS.HS.15.2.a.	Identify hierarchies in networking file management systems.
CIS.HS.15.2.b	Describe permission issues related to file management systems.
CIS.HS.15.2.c	Use command prompt tools to access network information.
CIS.HS.15.2.d	Use the internet control message protocol to ping devices on a network.
CIS.HS.15.2.e	Exercise backup and system restoration.
CIS.HS.15.2.f	Configure a network to perform a specific function.
CIS.HS.15.2.g	Implement simple security administration.
CIS.HS.15.2.h	Perform user and group administration on a system.
CIS.HS.15.2.i	Create a virtual network environment.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | NETWORKING

NETWORKING (cont.)

CIS.HS.15.3   Apply and adapt network media and topologies to maintain a functional network.

CIS.HS.15.3.a   Describe basic network classifications, topologies, and network operating systems.

CIS.HS.15.3.b   Identify the characteristics and uses of network components (e.g., hub, switches, routers, firewall).

CIS.HS.15.3.c   Identify the characteristics of LAN transmission methods, standards, and protocols.

CIS.HS.15.3.d   Explain the difference between basic point-to-point (PTP) and point-to-multipoint (PTM) network topologies.

CIS.HS.15.3.e   Demonstrate (or map) the relationship between IP and DNS.

CIS.HS.15.3.f   Use the Developer Tools in an Internet browser to explore HTTP requests, status codes, and HTTP exchanges conducted over TCP/IP.

CIS.HS.15.3.g   Identify the basic capabilities of server operating systems.

CIS.HS.15.3.h   Identify the basic characteristics of WAN technologies.

CIS.HS.15.3.i   Identify the seven layers of the OSI model and their functions.

CIS.HS.15.3.j   Select the appropriate NIC and network configuration settings when given a network configuration.

CIS.HS.15.4   Distinguish the components and functions of network devices.

CIS.HS.15.4.a   Differentiate between major hardware components and their functions.

CIS.HS.15.4.b   Identify types of computer storage devices.

CIS.HS.15.4.c   Identify practices for hardware life cycle management.

CIS.HS.15.4.d   Analyze the cost/benefits of different networking system configurations and components.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | NETWORKING

NETWORKING (cont.)

CIS.HS.15.4   Distinguish the components and functions of network devices.

CIS.HS.15.4.a   Differentiate between major hardware components and their functions.

CIS.HS.15.4.b   Identify types of computer storage devices.

CIS.HS.15.4.c   Identify practices for hardware life cycle management.

CIS.HS.15.4.d   Analyze the cost/benefits of different networking system configurations and components.

CIS.HS.15.5   Plan, configure, and troubleshoot a network.

CIS.HS.15.5.a   Run computer diagnostics.

CIS.HS.15.5.b   Identify troubleshooting issues involving the boot process for a computer.

CIS.HS.15.5.c   Identify common symptoms and resolutions for hardware problems.

CIS.HS.15.5.d   Identify common symptoms and resolutions for software problems.

CIS.HS.15.5.e   Diagnose and resolve operating system problems with appropriate tools.

CIS.HS.15.6   Identify concepts of networking tools to manage and implement networks.

CIS.HS.15.6.a   Identify and describe the appropriate tools used by a technician.

CIS.HS.15.6.b   Describe the purpose of configuration management documentation.

CIS.HS.15.6.c   Predict the impact of a particular security implementation on network functionality when given a wiring task.

CIS.HS.15.6.d   Explain different methods and rationales of network performance optimization.

CIS.HS.15.6.e   Use the appropriate network monitoring resource to analyze traffic.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | NETWORKING

NETWORKING (cont.)

CIS.HS.15.7   **Integrate security in the design and management of networks.**

CIS.HS.15.7.a   Categorize different types of network security appliances and methods.

CIS.HS.15.7.b   Explain common threats, vulnerabilities, and mitigation techniques.

CIS.HS.15.7.c   Identify security protocols and describe their purpose and function.

CIS.HS.15.7.d   Define the function of remote access protocols and services.

CIS.HS.15.7.e   Explain the methods of network access security.

CIS.HS.15.7.f   Explain methods of user authentication.

CIS.HS.15.7.g   Identify the purpose, benefits, and characteristics of using a proxy.

CIS.HS.15.7.h   Implement appropriate wireless security measures.

CIS.HS.15.7.i   Install and configure a basic firewall.

CIS.HS.15.8   **Identify opportunities in an information technology career field including but not limited to entrepreneurial opportunities, responsibilities, education, and certification.**

CIS.HS.15.8.a   Identify information technologies used in various industries.

CIS.HS.15.8.b   Discuss the impact of technology on all career fields.

CIS.HS.15.8.c   Identify common tasks in career fields.

CIS.HS.15.8.d   Discuss career opportunities in information technology career fields.

CIS.HS.15.8.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | IT OPERATIONS MANAGEMENT | NETWORKING

IT FUNDAMENTALS

COURSE DESCRIPTION

IT Fundamentals develops the students' abilities to analyze, evaluate, strategize, and reflect upon technologies such as computer hardware, computer software, web technologies, databases, networking, security, and software development. Students will also be introduced to ever-changing information technology careers along with developing positive and ethical behaviors/practices.

STANDARDS AND INDICATORS:

CIS.HS.12.1   **Identify and describe the basic components of information technology.**

CIS.HS.12.1.a   Identify and distinguish the differences between input and output devices.

CIS.HS.12.1.b   Identify and explain how various components meet the needs of the user.

CIS.HS.12.1.c   Identify and analyze emerging technologies.

CIS.HS.12.1.d   Identify storage options.

CIS.HS.12.1.e   Identify the process to configure permissions for files and folders.

CIS.HS.12.1.f   Explain multiple methods of moving digital files.

CIS.HS.12.2   **Identify and analyze hardware components.**

CIS.HS.12.2.a   Identify the correct hardware to connect with external components.

CIS.HS.12.2.b   Determine and evaluate recommended hardware devices to solve specific problems.

CIS.HS.12.2.c   Troubleshoot basic computer hardware problems.

CIS.HS.12.2.d   Find and analyze resources to answer basic troubleshooting questions.

CIS.HS.12.2.e   Develop criteria for purchasing or upgrading computer system hardware.

CIS.HS.12.2.f   Identify and analyze proper input technologies for various tasks.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | WEB DEVELOPMENT | IT FUNDAMENTALS

IT FUNDAMENTALS (cont.)

CIS.HS.12.3   **Identify and analyze software components.**

CIS.HS.12.3.a   Identify and analyze software appropriate for specific tasks.

CIS.HS.12.3.b   Research and analyze software installation and upgrade options.

CIS.HS.12.3.c   Troubleshoot potential problems with software installation (i.e. bloatware).

CIS.HS.12.3.d   Compare and contrast the functions, features, and limitations of different operating systems and utilities (i.e.,open source and mobile proprietary operating systems).

CIS.HS.12.4   **Explain web technologies.**

CIS.HS.12.4.a   Identify the components (e.g., wires, cables, routers, etc.) that make up the Internet.

CIS.HS.12.4.b   Describe the types of Internet connections.

CIS.HS.12.4.c   Explain Transmission Control Protocol/Internet Protocol (TCP/IP).

CIS.HS.12.4.d   Identify and compare different types of web technologies: blogs, wikis, podcasts, RSS feeds, etc.

CIS.HS.12.4.e   Explain browser cache and the process of clearing it.

CIS.HS.12.5   **Design, administer, and deploy networks.**

CIS.HS.12.5.a   Define basic networking terminology.

CIS.HS.12.5.b   Describe the characteristics and uses of networks, network devices, and components.

CIS.HS.12.5.c   Identify the purpose of networks and their functionality.

CIS.HS.12.5.d   Identify tools, diagnostic procedures, and troubleshooting techniques for networks.

CIS.HS.12.5.e   Describe the process of configuring, optimizing, and upgrading of networks.

CIS.HS.12.5.f   Explore and use cloud computing.

CIS.HS.12.5.g   Research and analyze basic network security solutions.

CIS.HS.12.5.h   Design a theoretical network environment and create protocols on deploying and maintaining the network.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | WEB DEVELOPMENT | IT FUNDAMENTALS

IT FUNDAMENTALS (cont.)

CIS.HS.12.6   Apply database management strategies.

CIS.HS.12.6.a   Design and create database tables and relationships.

CIS.HS.12.6.b   Create database columns and specify properties.

CIS.HS.12.6.c   Name tables and fields in conformance with naming conventions.

CIS.HS.12.6.d   Insert, update, and delete records in a database.

CIS.HS.12.6.e   Import data into databases and transfer data between databases.

CIS.HS.12.6.f   Organize and store database files in a structured environment for users.

CIS.HS.12.6.g   Control user access to data and log access to the database by user and type of transaction.

CIS.HS.12.6.h   Backup, verify, and recover data in a database.

CIS.HS.12.6.i   Generate and print forms, reports, and results of queries (i.e., calculated fields, functions).

CIS.HS.12.7   Design, develop, test, and implement programs.

CIS.HS.12.7.a   Identify and define programming terminology.

CIS.HS.12.7.b   Explain the importance of life-long learning as a programmer.

CIS.HS.12.7.c   Analyze the strengths and weaknesses of different languages for solving a specific problem.

CIS.HS.12.7.d   Write code that uses logical operators (e.g., and, or, not, loops).

CIS.HS.12.7.e   Write code that uses conditional control structures (e.g., if, if-then-else).

CIS.HS.12.7.f   Test and debug code.

CIS.HS.12.7.g   Identify and analyze protocols to maintain the integrity of programs.

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IT FUNDAMENTALS (cont.)

CIS.HS.12.8   Assess protocols for security and risk management.

CIS.HS.12.8.a   Identify the goals, objectives, and purposes of cybersecurity first principles.

CIS.HS.12.8.b   Identify different types of security threats and vulnerabilities.

CIS.HS.12.8.c   Identify and analyze policies procedures for security, privacy, and risk management.

CIS.HS.12.8.d   Explain intellectual property laws (e.g., copyright, trademark).

CIS.HS.12.8.e   Identify and analyze confidentiality concerns.

CIS.HS.12.8.f   Discuss risk loss and prevention methods.

CIS.HS.12.8.g   Analyze and evaluate passwords.

CIS.HS.12.8.h   Identify personal risks and create personal protocols to differentiate between home and work.

CIS.HS.12.9   Identify opportunities in an information technology career field.

CIS.HS.12.9.a   Identify information technologies used in various industries.

CIS.HS.12.9.b   Discuss the impact of technology on all career fields.

CIS.HS.12.9.c   Identify common tasks within the information technology career fields in occupations.

CIS.HS.12.9.d   Discuss career opportunities in information technology career fields.

CIS.HS.12.9.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

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INFORMATION TECHNOLOGY APPLICATIONS II

COURSE DESCRIPTION

This course will focus on skill development in data science using word processing, spreadsheets, databases, and integration of applications utilizing advanced features. Students taking both Information Technology Applications I and II may be eligible for dual credit at a participating postsecondary institution. Skills, standards, and coursework align with industry certifications.

STANDARDS AND INDICATORS:

CIS.HS.11.1   Organize, aggregate, and manipulate data using advanced word processing features.

CIS.HS.11.1.a	Integrate other program files into word processing documents (insert, embed, and link).
CIS HS.11.1.b	Create and format tables using advanced features (formulas, styles).
CIS HS.11.1.c	Use advanced merge features to integrate spreadsheet and database information into the word processing document as fields and records.
CIS.HS.11.1.d	Create and manage styles.
CIS.HS.11.1.e	Plan, record, run, and edit Macros.

CIS.HS.11.2   Organize, aggregate, and manipulate data using advanced spreadsheet features.

CIS.HS.11.2.a	Create worksheet structures using formulas and advanced features. (e.g., logical statements, vLookup, financial, statistical functions, and named ranges).
CIS.HS.11.2.b	Interpret data through statistical analysis (e.g., sorting, filtering, forecasting, and pivot tables).
CIS.HS.11.2.c	Import, export, and share worksheet data.
CIS.HS.11.2.d	Customize formatting methods, including conditional formatting and other advanced formatting methods.

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INFORMATION TECHNOLOGY APPLICATIONS II (cont.)

CIS.HS.11.3   **Synthesize relational database concepts to design, manage, evaluate, and organize information.**

> CIS.HS.11.3.a   Design tables specifying properties for data entry and relationships.

> CIS.HS.11.3b   Construct multi-table queries to retrieve, organize, and aggregate data to draw conclusions.

> CIS.HS.11.3.c   Design forms and subforms for efficient and effective data entry or retrieval.

> CIS.HS.11.3.d   Design reports and subreports utilizing tables, graphs, sparklines, and pivot tables for displaying meaningful data.

> CIS.HS.11.3.e   Analyze relational data using Structure Query Language (SQL).

CIS.HS.11.4   **Consider the relationship between different programs to utilize data in one program to the next to create new documents.**

> CIS.HS.11.4.a   Utilize spreadsheets, presentation, and database information in word processing documents.

> CIS.HS.11.4.b   Utilize word processing, presentation, and database information in a spreadsheet.

> CIS.HS.11.4.c   Utilize word processing, spreadsheet, and database information in a presentation.

> CIS.HS.11.4.d   Utilize word processing and spreadsheet information in a database.

CIS.HS.11.5   **Describe the importance of ethical data collection and applicable conclusions.**

> CIS.HS.11.5.a   Analyze the privacy practices of data collection and use.

> CIS.HS.11.5.b   Analyze the security practices of data collection and use.

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INFORMATION TECHNOLOGY APPLICATIONS II (cont.)

CIS.HS.11.6 **Demonstrate critical thinking skills to integrate information technology tools to access, manage, and create new information.**

> CIS.HS.11.6.a Gather, evaluate, use, and disseminate information from multiple technology sources.
>
> CIS.HS.11.6.b Create purposeful, digitally designed products (e.g., brochure, presentation, website, portfolio).

CIS.HS.11.7 **Identify opportunities in an information technology career field including but not limited to entrepreneurial opportunities, responsibilities, education, and certification.**

> CIS.HS.11.7.a Identify information technologies used in various industries.
>
> CIS.HS.11.7.b Discuss the impact of technology on all career fields.
>
> CIS.HS 11.7.c Identify common tasks in career fields.
>
> CIS.HS 11.7.d Discuss career opportunities in information technology career fields.
>
> CIS.HS.11.7.e Describe the impact of technological change and the importance of lifelong learning in this career field.
>
> CIS.HS.11.7.f Identify the benefits of industry certification and higher education Programs.
>
> CIS.HS.11.7.g Identify the necessary skills to succeed in fields using data science.

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NEBRASKA CAREER AND TECHNICAL EDUCATION, PROGRAM OF STUDY STANDARDS | COMMUNICATION & INFORMATION SYSTEMS | WEB DEVELOPMENT | IT APPLICATIONS 2

WEB DESIGN AND DEVELOPMENT

COURSE DESCRIPTION

Students will demonstrate advanced knowledge of web/app design and languages by creating a content-rich and visually-pleasing website/app that captures and keeps visitors' interests. Focus will be given to effective page layout, image creation and manipulation, interactivity, content creation, and project management. This course may be available for dual credit at a postsecondary institution.

STANDARDS AND INDICATORS:

CIS.HS.18.1   Use code that is clear, well-formatted, and appropriately documented.

CIS.HS.18..a   Identify alternative codes and discuss advantages and disadvantages that led to their decision.

CIS.HS.18.b   Review code to identify and fix errors.

CIS.HS.18.1.c   Determine if existing code opens a website up to vulnerabilities.

CIS.HS.18.2   Assess content for accessibility issues and discuss the issue and possible solutions.

CIS.HS.18.2.a   Analyze content flow and present alternative content with screen readers and other adaptive technologies.

CIS.HS.18.2.b   Consider mobile application functionality when network access is not available.

CIS.HS.18.3   Create a single functional web page based on a design mockup and user requirements.

CIS.HS.18.3.a   Explain client and target audience needs.

CIS.HS.18.3.b   Assess the needs of clients based on current trends.

CIS.HS.18.3.c   Demonstrate use of collaborative development tools.

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WEB DESIGN AND DEVELOPMENT (cont.)

CIS.HS.18.4 **Create a web program that will utilize multiple languages and servers and will run on multiple platforms.**

CIS.HS.18.4.a   Create a functional website with both front-end and back-end file management.

CIS.HS.18.4.b   Employ a variety of web technologies to produce a final product that meets industry web development standards.

CIS.HS.18.5 **Identify common tools used for workflows associated with content generation.**

CIS.HS.18.5.a   Identify one or more tools (i.e., proprietary, open source, or otherwise) that are capable of creating the required content (i.e., image, video, text).

CIS.HS.18.5.b   Compare various tools designed for the same workflow.

CIS.HS.18.6 **Create web pages/apps without the aid of a prefabricated template.**

CIS.HS.18.6.a   Illustrate industry standard development practices by coding web pages/apps.

CIS.HS.18.7 **Identify information that may be private or subject to ethical consideration.**

CIS.HS.18.7.a   Identify issues with collected information such as usernames, passwords, location data, and preferences, and discuss the possible ramifications of misuse.

CIS.HS.18.7.b   Identify the benefits of a minimal set of permissions when authoring a mobile app and possible consequences of over requesting permissions.

CIS.HS.18.8 **Describe opportunities in an information technology career field including but not limited to entrepreneurial opportunities, responsibilities, education, and certification.**

CIS.HS.18.8.a   Identify information technologies used in various industries.

CIS.HS.18.8.b   Discuss the impact of technology on all career fields.

CIS.HS.18.8.c   Identify common tasks in career fields.

CIS.HS.18.8.d   Discuss career opportunities in information technology career fields.

CIS.HS.18.8.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

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FOUNDATIONS OF WEB DESIGN

COURSE DESCRIPTION

Students will demonstrate knowledge of web and mobile app design to create an effective website or app that captures and keeps visitors' interests. Students will demonstrate project management skills, while also enhancing creativity, problem solving, and critical thinking. Students will explore career opportunities in an information technology career field.

STANDARDS AND INDICATORS:

CIS.HS.9.1   Explain and apply appropriate web design language and terminology.

CIS.HS.9.1.a   Describe the principles and goals of website design.

CIS.HS.9.1.b   Describe the principles and goals of responsive design.

CIS.HS.9.1.c   Describe binary code.

CIS.HS.9.1.d   Define common industry terminology.

CIS.HS.9.2   Plan a website and/or app for a specific purpose.

CIS.HS.9.2.a   Develop a storyboard, mock-up, and wireframes for a website and/or app.

CIS.HS.9.2.b   Explain the design process in regards to audience, layout, time, and budget.

CIS.HS.9.2.c   Identify the target market audience's needs.

CIS.HS.9.2.d   Evaluate clients' needs based on current trends.

CIS.HS.9.2.e   Plan for responsive design.

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FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.3 **Analyze elements and principles of design to communicate ideas consistent with project goals.**

CIS.HS.9.3.a   Apply appropriate font and font family concepts.

CIS.HS.9.3.b   Demonstrate knowledge of design decisions in regards to shapes, lines, colors.

CIS.HS.9.3.c   Demonstrate knowledge of design decisions in regards to white space, margins, and layout of graphic and text.

CIS.HS.9.3.d   Incorporate text layout techniques such as kerning, leading, and alignment.

CIS.HS.9.3.e   Incorporate audio, visual, and graphic elements.

CIS.HS.9.3.f   Develop a focused concept, clear methods of conveyance, and unified theme that solves the given problem.

CIS.HS.9.3.g   Identify accessibility and standard compliance measures in order to communicate with a broad audience.

CIS.HS.9.3.h   Explain design decisions in regards to themes.

CIS.HS.9.3.i   Evaluate the impact of design decisions on the theme of a design.

CIS.HS.9.3.j   Explain design and project goals using a storyboard, mock-up, and wireframes.

CIS.HS.9.4 **Analyze legal and ethical responsibilities.**

CIS.HS.9.4.a   Apply copyright laws as appropriate in website and app creation.

CIS.HS.9.4.b   Discuss security issues that are related to the utilization of the computer and/or Internet.

CIS.HS.9.4.c   Describe situations where web pages and/or apps may be used unethically.

CIS.HS.9.4.d   Describe licensing agreements.

CIS.HS.9.4.e   Discuss the importance of creative commons.

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FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.5   **Create and test websites and/or apps designed for cross browser and mobile compatibility.**

CIS.HS.9.5.a   Utilize standards-compliant elements in code that delivers essential content and functionality if older browsers are not capable of displaying content.

CIS.HS.9.5.b   Create websites and/or apps that utilize responsive design to allow for a variety of screen sizes and geometries to view the content in a meaningful and logical fashion.

CIS.HS.9.5.c   Test an application on devices of varying geometries and operating system versions to ensure maximum compatibility.

CIS.HS.9.6   **Implement quality assurance processes to deliver effective digital communication.**

CIS.HS.9.6.a   Evaluate the website and/or app functionality.

CIS.HS.9.6.b   Test a website and/or app in a variety of environments.

CIS.HS.9.6.c   Evaluate site effectiveness through user search and accessibility to meet all audience needs.

CIS.HS.9.6.d   Investigate web hosts.

CIS.HS.9.6.e   Troubleshoot and maintain a website and/or app.

CIS.HS.9.6.f   Evaluate cross-browser compatibility.

CIS.HS.9.6.g   Identify the process of securing a domain name.

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FOUNDATIONS OF WEB DESIGN (cont.)

CIS.HS.9.7   **Critique a website and/or app in accordance with web design principles.**

    CIS.HS.9.7.a   Assess download time.

    CIS.HS.9.7.b   Assess readability of the website and/or app.

    CIS.HS.9.7.c   Assess ease of navigation for both website and/or app.

    CIS.HS.9.7.d   Assess the design theme of a website and/or app.

    CIS.HS.9.7.e   Assess consistency of the theme across the entire website and/or app.

    CIS.HS.9.7.f   Assess the functionality of links.

CIS.HS.9.8   **Identify opportunities in an information technology career field including but not limited to entrepreneurial opportunities, responsibilities, education, and certification.**

    CIS.HS.9.8.a   Identify information technologies used in various industries.

    CIS.HS.9.8.b   Discuss the impact of technology on all career fields.

    CIS.HS.9.8.c   Identify common tasks in career fields.

    CIS.HS.9.8.d   Discuss career opportunities in information technology career fields.

    CIS.HS.9.8.e   Describe the impact of technological change and the importance of lifelong learning in this career field.

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