Information Systems Pathway

Purpose

Career and Technical Education (CTE) is committed to alignment of all courses within the career pathways model. Research was conducted in the exploration of high demand careers and it was determined that the Information Systems pathway courses would lead to superior career outcomes for U-46 students.

Rationale

The Information Systems career pathway has many opportunities for students to succeed with a variety of career options. However, our current high school course offering is not in alignment with current best practices. We are examining the entire pathway in order to create a robust offering that is appealing to a wide variety of students.

Courses We are Examining:

Computer Applications- semester

Advanced Computer Applications- semester

Web and Media Design- semester

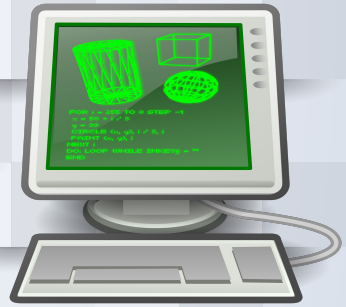
Advanced Web and Media Design- semester

Media Design and Presentation- semester

Ap Computer Science Principles- Year long

AP Computer Science A- year long

National Review



Research was conducted into the overview of need utilizing the Model Programs of Study and the Career Outlook guide to determine this pathway was reputable and would lead to superior career outcomes for students. During that exploration, further evidence was collected to examine the outcomes within the pathway for different strands and how those aligned with our current offering as well as accessing the PWR Act and PaCE framework.

National Outcomes

It was determined that courses within the Computer Information Systems and Programming strand and the Networking, Cloud Computing, and Cybersecurity strand were the most robust in terms of superior career outcomes. Whereas, Web Development had the least potential for superior career outcomes of the areas within the pathway.

Standards

Further examination was conducted into the Illinois State Board of Education (ISBE) state standards on Computer Science and cross-referenced with the Common Core State Standards and college/workplace readiness standards. The team was able to determine the standards that are necessary for this pathway to be viable and successful.

Post-Secondary Data

The team also looked at data on the profile of a U-46 graduate as well as conferred with representatives from university Computer Science programs at Elgin Community College, University of Illinois, Northern Illinois, Elmhurst University, and Judson College to have an understanding of what standards they found to make for a successful student in this pathway.

Post-Secondary Results

The research showed that there are many computer technician and entry-level computer career opportunities available for students who major in Computer Programming at a community college and students who had IS courses at the high school level had greater success in a computer program at the community college.
In order to be successful at a university or four-year college Computer Science program, students would need repeated exposure to computer programming courses at the high school level as well as a strong understanding of mathematical processing.

U-46 Middle School Essential Technology courses

Research was conducted into the current offering at the middle schools and it was found that, on average, 30% of U-46 middle schoolers who had completed 8th grade have taken at least one Essential Technology course. Middle school principals reported that the entry-level computer courses were exceptionally popular with the students. The team examined the middle school curriculum, attended a presentation by one of the middle school teachers explaining the curriculum, and learned how the middle school team had created an exciting and innovative set of courses to engage students in Information Systems.

Information Systems High School Enrollment

	Bartlett	Elgin	Larkin	South Elgin	Streamwood
Comp App	102	58	62	83	46
Advanced Comp App	28	22	10	27	22
Web Design	25	55	35	64	36
Advanced Web Design	17	6	0	17	10
Media and Design Pres	0	0	0	20	19
AP Computer Science Princ.	47	13	0	12	0
AP Computer Science A	28	0	0	24	0

Examination of Current Curriculum Findings:

- Overall, the two traditional computer programming courses lacked appropriate resources to support today's student. There also needed to be an investigation into software, hardware, and operational support.
- It was recommended that the Web Design aspect no longer be considered for the Pathway as it has become outdated.The media aspects of the course should be incorporated into traditional business courses.
- The Computer Applications/Adv. Comp. Apps courses did not have Career Pathway alignment.
- Heavy consideration should be given to packaged curriculum that included extensive teacher training.

Examination of Curriculum and Resources

Team members examined over 25 different resources and created a spreadsheet of their findings. They discussed how different curriculum met the standards and considered the differences in content, the variety of student learning experiences, and what instruction would look like. Team members investigated if there were any resources that had a Spanish version or language translation possibility. Unfortunately, they were not able to find any viable options.

Recommendations

- Five yearlong courses in the Information Systems Program of Study with an increase of three courses. Each course would build on earlier learning while offering students a variety of opportunities to explore their interests.

- CTE will no longer offer Computer Applications, Advanced Computer Applications, Web and Media Design, Advanced Web and Media Design, or Multimedia Design and Presentation. Elements of these courses will be incorporated into current Business courses. Marketing will be renamed Sports and Entertainment Marketing and become a yearlong course. Management and Entrepreneurship will become a yearlong course.

- AP Computer Science A will move from the Mathematics Department to the Career and Technical Education Department to have full pathway alignment and access to resources. We would no longer offer AP Computer Science Principles as the recommended new courses would replace it.

Computer Programming/Design

Computer Programming 1 (9-12) 1 semester

Computer Programming 2 (9-12) 1 semester

Computer Game Design 1 (9-12) Year long

Computer Game Design 2 (10-12) Year long

AP Computer Science A (10-12) Year long

Computer Programming 1

Overview:

This course provides an in-depth introduction to coding in Python. Upon completion, students will master fundamental coding concepts such as statements, variables, expressions, conditionals, and loops. Students will also gain proficiency with advanced topics including software libraries, automation, and sprite-based graphics.

Highlights:

- No prior knowledge needed
- Any math level
- Extensive teacher support/training
- Industry recognized certification PCEP Entry Level Python Programmer

Computer Programming 2

Overview:

This course continues the in-depth journey with coding in Python. During the course, students will master fundamental coding concepts such as file systems, information storage and retrieval, and error handling. Students will also gain proficiency with advanced topics including user-defined modules, data as values, data as references, and graphical user interfaces.

Highlights:

- Aligned transition from Comp. Pro 1
- Packaged curriculum any teacher can teach
- Industry recognized certification PCEP Certified Associate Python Programmer
- Can go directly into industry

Computer Game Design 1

Course Content

Overview:

This course teaches C# coding and game design with the Unity 3D Engine using a project-based approach. Beginning with little to no coding experience, students build their knowledge of C# and Unity by creating multiple full-featured games combining 3D models, animation, audio files, and scripts. Upon course completion, students will have the ability to create a 3D game from scratch on their own.

Highlights:

- Fully realized 3D platform for professionals
- Packaged curriculum with activities, projects, assessments incorporated
- Extensive teacher training and support
- Industry recognized certification as Unity User Programmer

Computer Game Design 2

Course Content

Overview:

Learn intermediate C# topics, such as collections, inheritance, interfaces, coroutines, and OOP best practices. Produce realistic audio effects in a 3D scene, accounting for natural phenomena like the doppler effect and reverberation. Apply real-world physics concepts to simulate how different materials respond to light in 3D graphics. Publish projects to an online career portfolio.

Highlights:

- ❑ Access and support to Esports League9l Turn gamers into makers
- ❑ No background needed- any teacher can teach
- ❑ Resources for Social/Emotional Learning alignment
- ❑ Career exploration embedded throughout course
- ❑ Industry recognized certification as Unity Associate Programmer

AP Computer Science A

This courses curriculum will not change, however, the following resources will be accessed as part of the curriculum to support a variety of learning opportunities and real world applications. All sites would require Student Online Personal Protection Act (SOPPA) agreement.

- Runestone Academy
- Codepost.io
- Codingbat.com
- Intellij Ultimate
- Pycharm
- Eclipse IDE
- Firebase Accounts
- Coding Rooms

Sports and Entertainment Marketing Course Content

Overview:

This introductory course helps students develop an extensive understanding of marketing concepts and theories that apply to sports, entertainment, and business. Areas covered in this course include: the basics of marketing, target marketing and segmentation, sponsorship, event marketing, promotion and marketing plans.

Highlights:

- **Extended to a yearlong course**
- **Incorporates Web Design aspects into projects**
- **Mindtap supports teachers engaging and transforming today's student into critical thinkers**
- **Dynamic assignments and applications that teachers can personalize**
- **Course resources come with real time analytics and a accessible reader**
- **Includes full, interactive e-book with autograded reading activities, flashcards, practice assessments and personalized feedback for student success**

Management and Entrepreneurship Course Content

Course introduces students to the risks and rewards of business ownership with a project-based pedagogy and a foundation in economic concepts. Students are guided through the elements and creation of a business plan, using a step-by-step narrative for selecting an idea for a business, social and ethical responsibilities, start-up options for the new business, operating the business, and expanding and exiting the business.

- Extended to a yearlong course
- Incorporates Web Design aspects into projects
- Ongoing project throughout course create business plan
- Soft skill integration throughout text
- Precision exams by Youscience support real world job skills and certification
- Online instructor materials

Cost

Item	Quantity	Unit Cost	Total Cost
Computer Programming I/ II	5 high schools site license - all access unlimited	$6,000	$30,000
Computer Game Design I & II	100 licenses per High School - PD included	$4,995	$23,726.25 (includes 5% discount)
Sports and Entertainment Marketing	500 licenses - PD included	$90.50	$45,250+ shipping/processing = $48,417.50
Computer Programming I/II Professional Development	10 days professional development	$5,000	$25,000
Computer Programming I/II Professional Development	Live Support Chat 24/7. Twice month one-on-one teacher check-in	$100	$2,500
Computer Programming I/II Professional Development	Vendor weekly check-in with Administration	Per year	$2,800
			$132,443.75

Professional Development Impact

Approximately 12 teachers will be impacted by these new courses. In some instances, a teacher would have to train on multiple courses. Professional development will occur over a three year period.

Sports and Entertainment Marketing - New textbook and resources, extended to a yearlong course. Approximately 7 teachers across the district teach this course. They will need training and support learning an extended curriculum.

Management and Entrepreneurship - Same textbook, extended curriculum to a year long course. Approximately 5 teachers across the district are impacted by this change. Many of them are the same staff that teach Sports and Enterinatment Marketing so training can be aligned for this group.

Computer Programming I/II - New curriculum and course. Approximately 4 teachers across the district will be impacted by this change. The vendor offers ten hours of instruction and then additional one-on-one sessions twice a month in perpetuity

Computer Game Design I/II - New curriculum and course. Approximately 4 teachers across the district will be impacted by this change. Many will be the same staff that are teaching Computer Programming I/II. Vendor offers professional development to train teachers on how to use the platform and implement it in their classrooms. Office hours every two weeks for teachers to ask questions and address student issues. Also included is on-demand support, 24-hour response time for issues and questions that come up with the technology or curriculum.

Recommendations for Implementation

Due to the scope of this recommendation, implementation will be a three-year process allowing for a gradual transition for staff and students. Students will be able to complete their original program of study if they begin it in 2023-2024 and staff will be able to learn the new course curriculum gradually over a three year period.

Course Transition Plan

2023-24
Team will develop course transition plan and incorporate discontinued courses into existing Business courses

2024-2025
Not offered
- Comp. Applications
- Web & Media Design
- Marketing

Offered
- Adv. Comp. Apps
- Adv. Web & Media
- Media Design & Pres.
- Sports and Enter. Mar.
- Management/ Entrep.

2025-26
No longer offered
- Comp. Apps
- Adv. Computer Apps
- Web & Media Design
- Adv. Web & Media Design
- Media Design and Presentation

2023-2024
Teachers will receive training in new computer programming and design courses

2024-2025
Offered
- Computer Pro. 1
- Computer Pro.2
- Comp.Game Design 1
- AP Comp. Sci A

Not offered
- Comp. Game Design 2
- AP Comp. Sci Principles

2025-2026
Offered
- Computer Pro 1
- Computer Pro 2
- Computer Game Design 1
- Computer Game Design 2
- AP Comp Sci A

Plans for the Evaluation of Change

Teachers will have professional development time each academic year to collaborate, evaluate, and make changes to the courses. Due to the nature of these courses, the vendors will remain active as teacher knowledge and reflection evolve. Data will be collected beginning in the 2024-2025 academic year on success criteria with formative and summative exams. Teachers will be given the opportunity to compare student success with one another and make changes based on students' learning needs.

A main objective of this work is to increase student enrollment in the computer programming and design courses. Data will be collected over a five-year time period beginning in the 2024-2025 academic year and will track student enrollment in Computer Programming I/II, Computer Game Design I/II, and AP Computer Science A. Further data will be collected over a ten-year period beginning in the 2025-2026 school year on post-secondary outcomes for the students who enroll and complete this program of study.

Questions

Contoso