

## Information Technology Career Field Pathways and Course Structure

### Courses in Information Support and Services (N0)

PATHWAY COURSES	SUBJECT CODE
Information Technology <sup>1</sup>	145005
Computer Hardware <sup>2</sup>	145025
Computer Software	145030
Networking <sup>2</sup>	145035
Network Operating Systems	145040
Network Security	145050
Computer and Mobile Applications	145020
Systems Analysis and Design	145075
Database Administration	145080
Web Design <sup>2</sup>	145010
Information Technology Capstone <sup>3</sup>	145015
ELECTIVE COURSES	SUBJECT CODE
Video and Sound	145110
Database Applications Development	145085
Programming <sup>2</sup>	145060
Object Oriented Programming	145065
Visual Programming	145070

<sup>1</sup>First course in the Career Field; <sup>2</sup>First course in the Pathway; <sup>3</sup>Does not count as one of the required four courses

### Courses in Interactive Media (N1)

PATHWAY COURSES	SUBJECT CODE
Information Technology <sup>1</sup>	145005
Design Techniques	145095
Creating and Editing Digital Graphics	145100
Multimedia and Image Management Techniques	145105
Video and Sound	145110
Animation	145115
3D Techniques	145120
Interactive Application Development	145125
Web Design <sup>2</sup>	145010
Information Technology Capstone <sup>3</sup>	145015
ELECTIVE COURSES	SUBJECT CODE
Programming <sup>2</sup>	145060
Object Oriented Programming	145065
Visual Programming	145070
Game Design	145090
Computer and Mobile Applications	145020
Systems Analysis and Design	145075

<sup>1</sup>First course in the Career Field; <sup>2</sup>First course in the Pathway; <sup>3</sup>Does not count as one of the required four courses

## Courses in Networking (N2)

PATHWAY COURSES	SUBJECT CODE
Information Technology <sup>1</sup>	145005
Computer Hardware <sup>2</sup>	145025
Computer Software	145030
Networking <sup>2</sup>	145035
Network Operating Systems	145040
Network Management	145045
Network Security	145050
Routing and Switching	145055
Web Design <sup>2</sup>	145010
Information Technology Capstone <sup>3</sup>	145015
ELECTIVE COURSES	SUBJECT CODE
Video and Sound	145110
Database Administration	145080
Programming <sup>2</sup>	145060
Object Oriented Programming	145065
Visual Programming	145070
Computer and Mobile Applications	145020

<sup>1</sup>First course in the Career Field; <sup>2</sup>First course in the Pathway; <sup>3</sup>Does not count as one of the required four courses

## Courses in Programming & Software Development (N3)

PATHWAY COURSES	SUBJECT CODE
Information Technology <sup>1</sup>	145005
Programming <sup>2</sup>	145060
Object Oriented Programming	145065
Visual Programming	145070
Systems Analysis and Design	145075
Database Administration	145080
Database Applications Development	145085
Game Design	145090
Web Design <sup>2</sup>	145010
Computer and Mobile Applications	145020
Information Technology Capstone <sup>3</sup>	145015
ELECTIVE COURSES	SUBJECT CODE
Video and Sound	145110
3D Techniques	145120
Animation	145115
Interactive Application Development	145125
Multimedia and Image Management Techniques	145105

<sup>1</sup>First course in the Career Field; <sup>2</sup>First course in the Pathway; <sup>3</sup>Does not count as one of the required four courses

## **Information Technology**

Subject Code: 145005

This first course in the IT career field is designed to provide students with a working knowledge of computer concepts and essential skills necessary for work and communication in today's society. Students will learn safety, security, and ethical issues in computing and social networking. Students will also learn about input/output systems, computer hardware and operating systems, and office applications.

## **Web Design**

Subject Code: 145010

Students will learn the dynamics of the Web environment while pursuing an in-depth study of both Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS). Web based protocols such as FTP, TCP/IP, and HTTP will be addressed. Students will create a website with tag text elements, special characters, lines, graphics, hypertext links, and graphical tables.

## **Information Technology Capstone**

Subject Code: 145015

The capstone course provides opportunities for students to apply knowledge, attitudes and skills that were learned in Information Technology program in a more comprehensive and authentic way. Capstones often include project/problem based learning opportunities that occur both in and away from school. Under supervision of the school and through community partnerships, students may combine classroom learning with work experience. This course can be delivered through a variety of delivery methods including cooperative education or apprenticeship.

## **Computer and Mobile Applications**

Subject Code: 145020

Students will learn to create applications for mobile devices using a variety of commercial and open source software. They will install these applications, modify them, and develop customer service skills to handle user issues. Knowledge and skills related to customer service in professional offices, small businesses, departments, work groups, and corporate information services will be addressed.

## **Computer Hardware**

Subject Code: 145025

Students will learn to install, repair, and troubleshoot computer hardware systems. They will perform preventative maintenance practices and learn techniques for maintaining computer hardware security. Communication skills and professionalism in troubleshooting situations will be emphasized.

## **Computer Software**

Subject Code: 145030

Students will apply knowledge and skills of commercial and open source operating systems in portable, stand alone, and networked devices. Students will install a variety of operating systems manually and using remote assistance. They will learn to configure, modify, and troubleshoot operating systems. Desktop virtualization, system security, and operating system history will be addressed.

## **Networking**

Subject Code: 145035

Students will install, configure, and troubleshoot network hardware and peripherals. Students will learn networking by exploring the OSI model, network topologies, and cabling. Students will design simple networks, know how to select physical devices, and be able to configure the equipment. Knowledge and skills relating to the operation and usage of network protocols will be developed.

### **Network Operating Systems**

Subject Code: 145040

Students will perform desktop client administrator duties by providing support for users in various work environments including professional offices, small businesses, work groups, departments, and/or corporate information services (IS). Students will learn to install, configure, and update commercial and open source network operating systems.

### **Network Management**

Subject Code: 145045

Students will perform network administrator duties by installing and configuring network hardware, software, and peripherals. Abiding by IEEE standards and the Open Source Interconnection (OSI) model, students will create advanced networks, assign user rights, and develop knowledge and skills of network hierarchy. Students will demonstrate mastery of topologies, remote connectivity, wireless networking, TCP/IP, network security, and network troubleshooting.

### **Network Security**

Subject Code: 145050

This course will address securing networks and operating systems. Students will learn to secure network communications, computer hardware, and network software. Topics included are network security theory, cryptography, security architecture, firewalls, VPNs, IP Security, and methods of protection.

### **Routing and Switching**

Subject Code: 145055

Student will learn the functions, characteristics, and operations of routers and switches. Students will learn about wireless network standards, components, and the role that routers play in enabling communications across multiple networks. Students will troubleshoot the routing process. Students will examine the use of Virtual Local Area Networks (VLANs) to create logically separate networks.

### **Programming**

Subject Code: 145060

In this course, students will learn the basics of building simple interactive applications. Students will learn the basic units of logic: sequence, selection, and loop. Students will apply algorithmic solutions to problem-domain scenarios. Students will gain experience in using commercial and open source languages, programs, and applications.

### **Object Oriented Programming**

Subject Code: 145065

Students will learn to represent programming concepts as "objects" that have data fields and associated procedures known as methods. Students will implement classes such as support static, instance method, inheritance, polymorphism, exception handling, and object serialization. A variety of commercial and open source programs and applications will be used.

### **Visual Programming**

Subject Code: 145070

Students will create event-driven programs using object oriented programming techniques for use in web based and standalone applications. Students will map out, design, and test computer applications, web applications, and mobile applications. Both commercial and open source programs and applications will be used.

### **Systems Analysis and Design**

Subject Code: 145075

Students will learn the theory and practice of software testing and develop an understanding of the analysis and design phases of software development. Students will effectively use appropriate programming languages and software patterns to improve software development. A variety of commercial and open source programs, applications, and tools will be used.

### **Database Administration**

Subject Code: 145080

Students will learn about user rights and responsibilities, concurrency security, reliability, backup and recovery to perform tasks involved in the administration and management of a database system. Students will design, extract and transform data ensuring data quality. Knowledge and skills relating to reporting systems, data warehouses, and data mining will be developed.

### **Database Applications Development**

Subject Code: 145085

Students will use developer strategies to manipulate data, present database systems theory, and develop database applications. Students will learn to import and export data, manipulate table properties, make advanced queries, and run basic SQL forms and reports. Students will develop macros for automating database tasks and building menu-driven applications. Knowledge and skills of data modeling, diagramming, query writing, and design theory will be developed.

### **Game Design**

Subject Code: 145090

This course will prepare students to design and program games using commercial and open source programs and applications. Students will learn industry standard programming language constructs to write programs that integrate classes, class methods, and class instances. Students will learn input method handling, animation, collision detection, game physics and basic artificial intelligence.

### **Design Techniques**

Subject Code: 145095

Students will learn techniques for transforming photographic images, through use of digital cameras, computers, and mobile devices. To accomplish this, they will learn software photo editing techniques including layering, color correction, masking, and special effects using current commercial and open source programs and applications.

### **Creating and Editing Digital Graphics**

Subject Code: 145100

Students will learn to design, develop, and produce interactive media projects, web sites, and social media contexts. Students will demonstrate methods of creating professional quality media using commercial and open source software.

### **Multimedia and Image Management Techniques**

Subject Code: 145105

Students will apply principles of image creation, management procedures, and multimedia techniques as they create, revise, optimize, and export graphics for video, print, and web publishing. The course will address issues related to web based publishing, social media, and security. Students will utilize current commercial and open source languages, programs, and applications.

**Video and Sound**

Subject Code: 145110

Students will create professional video and audio productions for distribution in traditional and new media channels. Students will plan, produce, edit, and launch media products. Students will develop scripts and storyboards, compose shots and operate cameras, capture sounds using microphone hardware, apply special effect techniques, and edit to achieve the final product. Students will be able to use animation and graphic design for video.

**Animation**

Subject Code: 145115

Students will use animation and storyboarding techniques to plan the production of an animation project. Students will design from script and storyboard actions in the pre-production planning process. Students will use commercial and open source digital animation software to create finished animations, cartoons, and other short movies. They will accomplish this using animated text, character movements, voice, background sound, sound effects, camera movements, and multiple scenes.

**3-D Techniques**

Subject Code: 145120

Students will use current industry standard commercial and open source programming software to create 3-D visual elements in a web or standalone environment. Students will learn aspects of computer visual production, thought, and application; to map out, design, and test three-dimensional elements.

**Interactive Application Development**

Subject Code: 145125

Students will learn skills to support and create interactive and engaging components for web and standalone interactive applications. Using commercial and open source programs and applications, students will master web interactivity with advanced techniques.