FY 2019 Information Technology Career Field Pathways and Course Structure

Information Support and Services N0 Pathway Courses	Interactive Media N1 Pathway Courses	Networking N2 Pathway Courses	Programing and Software Development N3 Pathway Courses	Cybersecurity N4 Pathway Courses
Information Technology[1]	Information Technology[1]	Information Technology[1]	Information Technology[1]	Information Technology[1]
Computer Hardware[2,4]	Design Techniques[2,4]	Computer Hardware[2, 4]	Systems Analysis and Design[2]	Cybersecurity[2]
Computer Software[4]	Creating and Editing Digital Graphics[2, 4]	Computer Software[4]	Programming[2, 4]	Computer Hardware[4]
Networking[4]	Multimedia and Image Management Techniques[4]	Networking[4]	Object Oriented Programming[4]	Computer Software [4]
Network Operating Systems[4]	Video and Sound[4]	Network Operating Systems[4]	Visual Programming[4]	Networking[4]
Network Security[4]	Animation[4]	Network Management[4]	Database Administration	Network Operating Systems[4]
Computer and Mobile Applications	3D Techniques[4]	Network Security[4]	Database Applications Development	Network Management[4]
System Analysis and Design	Interactive Application Development[4]	Routing and Switching	Business Informatics	Network Security[4]
Database Administration	Web Design[4]	Web Design[4]	Game Design	Routing and Switching
Web Design[4]	Information Technology Capstone[3]	Information Technology Capstone[3]	Web Design[4]	Programming[4]
Information Technology Capstone[3]	Programming[4]	Video and Sound[4]	Computer and Mobile Applications	Information Technology Capstone[3]
Video and Sound [4]	Object Oriented Programming[4]	Database Administration	Information Technology Capstone[3]	Cybersecurity Defense and Reinforcement
Database Applications Development	Visual Programming [4]	Programming[4]	Video and Sound[4]	Cybersecurity Testing and Response
Programming[4]	Game Design	Object Oriented Programming[4]	3D Techniques[4]	
Object Oriented Programming[4]	Computer and Mobile Applications	Visual Programming[4]	Animation[4]	
Visual Programming[4]	Systems Analysis and Design	Computer and Mobile Applications	Interactive Application Development[4]	
			Multimedia and Image Management Techniques[4]	

[1]First Course in the Career Field; [2] First Course in the Pathway; [3] Does not count as one of the required four courses; [4] Courses with CTAG credit available

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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.

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.

Business Informatics
Subject Code: 142040
Students will capture and use organizational knowledge and data to solve business problems and meet specific business needs. Students will select tools and techniques to facilitate knowledge sharing. They will also maintain and update knowledge management systems. They will examine business issues using business process analysis and complete data research and analysis using structured approaches and tools. Relationship management and project management skills will also be emphasized.

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.

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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.

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.

Cybersecurity
Subject Code: 146005
Students will learn the components of cybersecurity and the role each plays in preventing, detecting and mitigating vulnerabilities and attacks. Components include the security of the network infrastructure, security of the systems, and the prevention, detection, and mitigation of common vulnerabilities and attacks. Throughout this course, students will examine and implement security safeguards for desktop, network, and application security.

Cybersecurity Defense and Reinforcement
Subject Code: 146010
Students will learn the process of systematic defense for information technology systems. They will apply knowledge and skills required to secure network resources including infrastructure, operating systems, data, and applications. Students will apply the knowledge of disaster recovery and business continuity.

Cybersecurity Testing and Response
Subject Code: 146015
Students will apply the skills of systematic testing and planned response to mitigate security concerns in information technology systems. They will describe the need for security, identify and explain security risks, and implement security safeguards. Students will manage threats, deploy countermeasures, and establish strategies to protect business information using risk and incident management.

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.

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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, diagraming, query writing, and design theory will be developed.

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.

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.

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.

Information Technology Capstone
Subject Code: 145015
The capstone course provides opportunities for students to apply knowledge, attitudes and skills that were learned in their 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.

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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.

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.

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.

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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.

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.

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.

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.

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.

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.