Introduction to Information Technology

2020-2021
Grades: 9 -10
Prerequisite(s): None

Course Description

This is the first course inside of the ITA pathway and it is a survey course which provides scholars an introduction to the Information Technology Career Cluster and all of the pathways inside of this cluster. The goal is to give them exposure and some hands-on activities that will help them better understand what the field is about and where their interests may be greatest.

Students will learn about and do projects in: *IT Career Exploration, Digital Media, Hardware & Software, Communications & Networks, Software Development, Ethics, And New & Emerging Technologies.* Along with learning about IT as a career cluster, they will also explore how IT skills are used in **every** industry and career cluster across the globe.

Ultimately we want scholars to come to understand that having IT skills has reached the same level of importance for college and career success as core subjects like ELA, Math and Science; while offering the unique opportunity to make major contributions to society, the world of work and possibly the world of the future.

Course Units/Skills & Knowledge

This course is broken into 4 units:

UNIT 1: WHAT IS IT TO ME?
UNIT 2: IT FUNDAMENTALS
UNIT 3: FOUNDATIONS OF COMPUTER SCIENCE
UNIT 4: IMPACT OF IT

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UNIT 1: WHAT IS IT TO ME?

This unit introduces scholars to the field of Information Technology. Starting with defining and recognizing what is involved in this field and the impact IT has had on society and the world. Scholars will also look at IT from a personal lens; including digital citizenship, digital literacy, career opportunities and the impact of IT in their personal lives.

UNIT 1 UNDERSTANDINGS:

U1 Information Technology (IT) is the study, design, and development of computer systems (hardware and software) and networks, used for gathering, processing, and distributing data. It encompasses the type and ways humans use and share digital information.

U2 Information technology is a progressive and constantly changing industry, promising a wide range of opportunities. All industries need people with IT skills and knowledge, making IT one of the top career fields on a global scale.

U3 The ability to properly and responsibly communicate and navigate the digital world in a healthy, safe and responsible way is an essential skill for success at home, school and the world of work.

Skills	Knowledge
1. Define the terms: Information, Technology , Information Technology, Computers and Communications	❖ **Definitions of**: Information, Technology, and Information Technology, Computer, Communications
2. Defining and providing examples of the components of Information Technology.	❖ **Components of Information Technology**: People, Data, Hardware, Software, Use (Procedure)
3. Defining and providing examples of the four forms of digital information.	❖ **Four forms of Digital information**: Audio, Video, Text, Pictures
4. Define career cluster, and career pathway then describe and provide examples of careers inside each IT Pathway	❖ **IT Career Cluster & Pathways** ➢ Information support and services ➢ Interactive media ➢ Network systems ➢ Programming and software development
5. Recognizing the various career opportunities in IT; the skills, education, pay and avenues for obtaining those jobs.	❖ **Employability skills include**:Communication, Collaboration, Personal Mindset, Planning for Success, Problem Solving, Social Awareness

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6. Effectively utilizing search engines, keywords and shortcuts for research and information gathering 7. Synthesizing and citing sources 8. Evaluating information found online on the basis of accuracy, validity, and appropriateness for needs, importance, and social and cultural context.	❖ **Google/MS Office Suite Basics:** ➢ Email: access, setup, tools ➢ Docs/Slides/Sheets: sharing, templates, toolbars, ❖ **Digital Citizenship** ➢ How to use the internet ethically ➢ Avoid leaving a large digital footprint ➢ What is Cyberbullying how to recognize it and be anti-cyberbullying ❖ **Online Research Process**: *clarify, search, delve, evaluate, and organize* ➢ Intellectual property rights**,** the ease of accessing information through the Internet has caused serious concern about protecting intellectual property, including music, movies, digital books, software, and video games. Theft of intellectual property is a serious issue. ➢ How to properly cite a web source ➢ Patriot act and what it means as an internet user.

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UNIT 1: PERFORMANCE TASK:

PERFORMANCE TASK: (*How will students demonstrate their understanding (meaning-making and transfer) through a complex performance task?)* Scholars perform a debate to pass a bill that will ban the use of social media to citizens under the age of 21 in response to the mass shootings. It has been shown that social media plays a vital role in spreading the motives to perform mass shootings to young gullible people. Congress has failed to pass gun legislation to ban assault weapons. Video games already have some sanctions and regulations to prevent the sale to minors. The next thing is to control the platforms that spread and encourage hate and violence.

Goal
Your task is to research and perform a debate on whether a bill should pass to prevent young adults under the age of 18 from going on social media (facebook, twitter, snapchat, youtube, reddit.) The class would break off into for and against and make a vital argument for their case. The class will vote and come to a consensus whether this bill shall go forward or not. Individually using the notes

Role(s):-

- **Senators:** five students - research what a panelist does and lead the socratic debate by asking questions to the two teams. The panelist will decide whether to move forward or not
- **Reporters:** of the event, four students - Report what took place in a style of one of the three news styles that they represent Fox, Washington Post, NY Times etc... ask questions after debate)
- **Team for the bill** - Research and have experts, argue for the bill, answer questions from panelists and reporters (write a reflection)
- **Team against the bill**- Research and have experts, argue against the bill answer questions from panelists and reporters (write a reflection)
- **Videographers** two students- record the event (review and document which segments you would use)

Audience - Peers, Teacher, Google Classroom

Situation -In response to the mass shootings government must do something in response The U.S. Congress has failed to pass a bill to ban the sale of assault weapons, so they have decided to go after social media outlets and the Internet as a way to prevent teens from access to violent content, the dark web, extremist sites, and use of social media for bullying and encouraging violence or violent acts. The bill would make age 18 the limit for accessing Social Media sites and many portions of the Internet.

Product - Written and Verbal arguments for and against the / video, reflections on individual roles, personal statement with evidence (blog, letter to the editor) on their personal stance on the issue.

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UNIT 2: IT FUNDAMENTALS

This unit introduces scholars to the foundational concept of computers as tools created by humans to solve problems or perform tasks. They will learn the history and foundation of both hardware and software while focusing on the systems model and how it is used to collect, manage, store and output information or "data"; it's exponential growth, connection to communication networks and the importance of information security.

UNIT 2 UNDERSTANDINGS:

U1 Computers are tools created by humans to meet their needs therefore both software and hardware are designed to perform IPSO

U2 Computer systems have evolved and continue to evolve based on human needs and technological advances.

U3 Electronic Computers work off of Binary code: 0 & 1, which can then be translated into a variety of higher level languages that humans can then understand.

U4 Hardware is designed to meet the needs of input , processing , output, storage and information management activities

U5 Computer software is either written to help hardware do its job (Operating Software) or for humans to perform a task (Application Software)

Skills	Knowledge
1. Defining and explaining the terms that are a part of the field of Information Technology 2. Identifying and utilizing the binary number system 3. Translate binary into, digits, hexadecimal, and characters using ASCII 4. Convert units (Kilo, Mega, Giga, Tera) used to measure computer performance 5. Recognizing the different components of a computer system and interpret its performance	❖ Definitions of **IPSO** Input Processing Storage Output ❖ **Binary/Machine Language**: 0's & 1's as the foundation of all information ➢ Conversion from Binary to Decimal ➢ Conversion from Binary to ASCII ❖ **Components of Computer System**: ➢ Hardware: I/O Devices, Storage, Memory , Processing, Cabling ➢ Software: Firmware, Operating Software, Application Software ❖ **Performance of a Computer System**: ➢ Speed: *hertz, cores*

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6. Design a computer system with compatible hardware and software 7. Connect the various career opportunities in IT; the skills, education, pay and avenues for obtaining those jobs, to students personal career goals and character attributes.	➢ Capacity: *bytes, terabytes, gigabytes, megabytes, kilobytes* ❖ **Form/Function of Computer Systems:** ➢ *Super, Desktop, Mobile, Embedded* ❖ **Software in a Computer System** ➢ Operating System Apple, Microsoft and Linux ➢ Applications software that does a specific task ❖ **Recognizing the various career opportunities in IT; the skills, education, pay and avenues for obtaining employment.** ➢ IT Support Specialist

UNIT 2 PERFORMANCE TASK:

PERFORMANCE TASK: *How will students demonstrate their understanding (meaning-making and transfer) through a complex performance task?)* Scholars will use the knowledge they have gained over the unit on IT fundamentals, their ability to do online research, and a scenario provided by the instructor to formulate or develop an *IT Equipment Purchasing Plan*. The plan must demonstrate an IT Technician level, the understanding of form and function as it relates to how computer systems are chosen and purchased inside of a business.

Goal: To choose a computer system that fits the form and function of the employees in the company you are working.

Role -
IT Technician for one of the following: a Payroll Company/Engineering Firm/Public School/Carpentry Business/Senior Retirement Community

Audience - Your co-workers

Situation - All companies have technology needs and a limited amount of funding to purchase this technology. It is the responsibility of the IT
Department to take the lead in determining the best technology based on employee needs and company's budget. IT purchases of equipment do not happen yearly, so the computer system that is purchased must meet the current needs of the employees as well as grow with them into the future.

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Product -Your task is to create a written *IT Equipment Purchasing Plan* that includes a summary of the decision making process used, a listing of the equipment both hardware/software, including a cost per unit. Taking this information you will be required to create a two slide presentation that summarizes your written plan, which you will present at a purchasing meeting in the near future.

UNIT 3: FOUNDATIONS OF COMPUTER SCIENCE

This unit attempts to answer the question - *how do computers think?* - and covers some history and structure of the digital computer, basics of binary and data representation. This unit also focuses on problem solving, basic algorithm development then simple structured programming and an introduction to coding.

UNIT 3 UNDERSTANDINGS:

U1 The role of hardware platforms in computing from the Input/Storage/Processing/Output model to modern "smart" devices to understand the ways in which non-traditional computing platforms take input and provide output

U2 There are many ways computers use written instructions to be performed by a Central Processing Unit or microprocessor; a complex system of integrated circuitry.

U3 Programming languages are used by computer scientists for cpu instruction and how this can lead to innovation and exploration of new ideas in computer science

U4 Digital devices, their programs and the networks that interconnect them enable innovation in both computer science and in other fields including: science, arts, medicine, engineering and business

Skills	Knowledge
1. Develop Pseudocode to solve problems and demonstrate their thinking 2. Breaking down larger tasks into simpler ones and prioritizing them 3. Use Loops, Variables, Functions, Conditionals to be a efficient coder and solve problems	❖ **Interaction of hardware and the software** ❖ **Instructions are algorithms** (steps) that involve protocols (rules) to get to a result (program) ❖ **Basic rules(protocols)** Conditionals, Loops, Variables, (Functions), Control Flow

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4. Troubleshoot / debug their programs 5. Design a simple wireframe interface for an app 6. Logically putting in order sequential events 7. Connect the various career opportunities in IT; the skills, education, pay and avenues for obtaining those jobs, to students personal career goals and character attributes. 8. How to build a basic HTML website using HTML Tags with tables, links, and images 9. Use CSS to edit the website	❖ **CPU**: ➢ Electric Circuits (Parallel, single, switch, diodes) ❖ **Input, Output and Storage Hardware** ❖ **Application Software vs. Operating Software** - Different Programming languages are designed for different for specific tasks ❖ **Foundation of Web Development** :HTML, XTML and CSS, domain names ❖ **Career opportunities in IT;** Software engineer, App Development, Game Designer, Front end and Back end Web developer

UNIT 3: PERFORMANCE TASK:

PERFORMANCE TASK: *How will students demonstrate their understanding (meaning-making and transfer) through a complex performance task?)* Scholars will use the knowledge they have gained over the unit on

Goal: Write a program for the mock up robot on the dash to act like a guard dog. It will move in a threatening way once someone is within a foot, make noise, flash it lights. If the trespasser doesn't move or back away you will launch a stink bomb at them scaring them away. If they still stand their ground the dog will then charge at them for several feet barking and flashing it lights.

Role - You are a programmer in Boston Dynamics your team of two are to develop the program for their fierce robotic guard dog. If successful other major corporations are looking to purchase the robot to save costs on security.

Situation- Amazon in response to the Covid and future markets has decided to automate their security with robotic Guard Dog.They want to build hundreds of robots for their warehouses to prevent theft and save on security costs. Boston Dynamics, a leading robotics developer for the military and law enforcement was hired to develop the robot.

Audience - Anyone

Product - A computer program using the Dash robots

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UNIT 4: IMPACT OF IT

This unit focuses on how computers and computational thinking has changed the way people think, work, live, and play. How computer systems have permanently changed the way humans communicate, collaborate, and problem-solve. Students in this course will become familiar with the many ways in which (IT) computing enables innovation in other fields now and into the future.

UNIT 4 UNDERSTANDINGS:

U1 The evolution of the internet and how it has driven the growth of IT and will continue to do so into the future.

U2 Technology facilitates greater efficiency, and productivity in our daily lives, how society and employment will change with it.

U3 IT moral and ethical dilemmas are constantly changing as they relate to race, ethical, social, psychological, political, and economic implications, and so will laws, regulations, and information security.

U4 Everyone must be a responsible Digital Citizen, and it's up to the IT profession to model and mentor others how to be a good Digital Citizen.

Skills	Knowledge
1. Thinking critically and analyzing a technological advancement problem solves and develops a solution. 2. Initiate and participate effectively in a range of collaborative discussions (one on-one, in groups, and teacher-led) building on others' ideas and expressing their own clearly and persuasively. 3. Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source. 4. Research a topic build an argument using multiple valid sources 5. Present information, findings, and supporting evidence clearly, concisely, and logically using Digital Media and the	❖ **Definition of Internet:** ➢ global network connecting computers together sharing information using standard protocols ❖ **Definition - World Wide Web** ➢ PART of the Internet which allows documents to be connected to other documents by hypertext links, enabling the user to search for information by moving from one document to another. ❖ **Internet Past & Present** ➢ Arpanet/NSF/WWW ➢ New technologies: IOT, Cloud Computing, etc. ❖ **IT & Globalization -**Information technology has changed and reshaped job design and society in a number of ways

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Internet.	❖ **Emerging Trends in IT** Determine the trends in emerging IT, including future computer technologies and their influence on the future. ➢ Artificial Intelligence ➢ Quantum Computing ➢ Internet of Things ➢ Embedded IT ❖ **Career opportunities in IT:** Network Programmer, Network Service, Network Security, Network Engineers, Cloud Computing,

UNIT 4 PERFORMANCE TASK:

PERFORMANCE TASK: (*How will students demonstrate their understanding (meaning-making and transfer) through a complex performance task?)* Scholars will be responsible for researching the merits of pushing through some federal standards or guidelines to protect citizens from the misuse of AI in particular Facial Recognition under a social justice platform

Goal: provide background information and analysis on the issues so that congress can better understand the existing situation to determine whether there is a problem requiring a legislative remedy (bill or law to be passed).

This assistance will be a summary and explanation of the AI technology, the scientific evidence demonstrating the pros and cons of this AI technology, both of which should include links to newspaper and journal articles discussing the issue from different perspectives with the main focus being around the charge that facial recognition AI is biased against certain races which would make it a social justice issue for lawmakers.

Role(s): You are members of the Congressional Research Service which offers Congress research and analysis on all current and emerging issues of national policy providing a balanced, nonpartisan and accurate information to congress before a bill is brought before any committees. CRS analysts are governed by requirements for confidentiality, timeliness, accuracy, objectivity, balance, and nonpartisanship. Your team falls under the office of Information Management and Technology.

Audience: CRS - Research Brief will be posted to the site for Congressional members and their support staff to access as needed.

Situation Artificial intelligence (AI), the development of computer systems to perform tasks that normally require human intelligence, such as learning and decision making, has the potential to transform and spur innovation across industry and government. As the science and technology of AI

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continues to develop, more products and services are coming onto the market. For example, companies are developing AI used in health care technologies, self-driving cars, digital assistants, criminal justice and many other areas of daily life.

Several studies have shown that AI systems for facial recognition have a bias or do not correctly identify people of color and this is a real concern about its potential misuse or unintended consequences. This has promoted efforts to examine and develop federal standards to create building blocks for reliable, robust, and trustworthy AI systems in general and for facial recognition in particular.

Product: CRS - Research Brief that will be posted to the site for Congressional members and their support staff to access as needed.

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