

INFORMATION TECHNOLOGY PROGRAM OF STUDY

Pathway Description

Information Technology (IT) remains one of the fastest growing and highest paid employment sectors in the state of New Jersey. The annual average wage for job opportunities in New Jersey's technology cluster was \$103,797 in 2014 (That's 173% of the statewide average (\$60,146) for all industries). Like many other STEM fields, the current demand and supply are mismatched, as computer science career openings outpace students' skills and interest. Also, like many other fields, computer science interest starts long before a student decides on a major or even applies to college.

Our Information Technology program gives our students access to the very latest in computational thinking. The curriculum empowers students to become creators rather than consumers of the technology, coupled with exploring the impact of computing on society and building skills in digital citizenship and cybersecurity. Through this program students will learn the latest on the creation of apps for mobile devices, game design, programming language, visualization of data, cybersecurity, and designing and implementing user interfaces and web-based databases.

This pathway includes a rigorous series of courses designed by Project Lead The Way (a nonprofit, STEM education program taught across the U.S. and endorsed by the nationally recognized College Board). The courses include: Introduction to Computer Science, Computer Science Principles, Computer Science A, and Cybersecurity. The pathway will also integrate additional information technology courses to ensure students have a broader perspective on the opportunities available in the IT field including: Networking I and Networking II.

INFORMATION TECHNOLOGY PROGRAM OF STUDY
Course Sequence

CORE	GRADE 9	GRADE 10	GRADE 11	GRADE 12
ENGLISH	ENGLISH I	ENGLISH II	ENGLISH III OR AP LANGUAGE/COMP	ENGLISH IV OR AP LITERATURE/COMP
SOCIAL STUDIES	WORLD HISTORY	US HISTORY I OR PRE AP US HISTORY I	US HISTORY II OR AP US HISTORY II	AP HISTORY OR SS ELECTIVE
MATHEMATICS	ALGEBRA I OR GEOMETRY	GEOMETRY OR ALGEBRA II	ALGEBRA II OR PRECALCULUS	PRECALCULUS OR AP CALCULUS AB/BC OR MATH ELECTIVE
SCIENCE	BIOLOGY	CHEMISTRY	PHYSICS OR AP PHYSICS I	AP SCIENCE OR SCIENCE ELECTIVE
HEALTH/PHYSICAL EDUCATION	FITNESS AND HEALTH I	FITNESS AND HEALTH II	FITNESS AND HEALTH III	FITNESS AND HEALTH IV
CTE MAJOR	GRAPHIC DESIGN	NETWORKING I	NETWORKING II	CYBERSECURITY
INTERDISCIPLINARY STUDIES	INTRODUCTION TO COMPUTER SCIENCE	COMPUTER SCIENCE PRINCIPLES	COMPUTER SCIENCE A	FINANCIAL LITERACY
WORLD LANGUAGE	SPANISH I	SPANISH II	SPANISH III	AP SPANISH OR ELECTIVE

Information Technology Program of Study
Course Credits

Freshman

English I	5 credits
World History	5 credits
Algebra I or Geometry	5 credits
Biology	5 credits
Spanish I	5 credits
Fitness and Health I	5 credits
Graphic Design	5 credits
Introduction to Computer Science	5 credits

Sophomore

English II	5 credits
US History I or Pre-AP US History I	5 credits
Geometry or Algebra II	5 credits
Chemistry	5 credits
Spanish II	5 credits
Fitness and Health II	5 credits
Networking I	5 credits
Computer Science Principles	5 credits

Junior

English III or AP Language/Comp	5 credits
US History II or AP US History II	5 credits
Algebra II or Pre-calculus	5 credits
Physics or AP Physics I	5 credits
Spanish III	5 credits
Fitness and Health III	5 credits
Computer Science A	5 credits
Networking II	5 credits

Senior

English IV or AP Literature/Comp	5 credits
AP History or SS Elective	5 credits
Pre-calculus or AP Calculus AB/BC or Math Elective	5 credits
AP Science or Science Elective	5 credits
AP Spanish or Elective	5 credits
Fitness and Health IV	5 credits
Cybersecurity	5 credits
Financial Literacy	5 credits

Information Technology *Course Descriptions*

Course Title: Introduction to Computer Science

Grade Level: 9

Credits: 5

Designed to be the first computer science course for students who have never programmed before, ICS is an optimal starting point for the PLTW Computer Science program. Students work in teams to create apps for mobile devices using MIT App Inventor®. They explore the impact of computing in society and build skills in digital citizenship and cybersecurity. Beyond learning the fundamentals of programming, students build computational thinking skills by applying computer science to collaboration tools, modeling and simulation, and data analysis. In addition, students transfer the understanding of programming gained in App Inventor to text-based programming in Python® and apply their knowledge to create algorithms for games of chance and strategy.

Course Title: Computer Science Principles

Grade Level: 10

Credits: 5

Using Python® as a primary tool and incorporating multiple platforms and languages for computation, this course aims to develop computational thinking, generate excitement about career paths that utilize computing, and introduce professional tools that foster creativity and collaboration. While this course can be a student's first in computer science, students without prior computing experience are encouraged to start with Introduction to Computer Science. CSP helps students develop programming expertise and explore the workings of the Internet. Projects and problems include app development, visualization of data, cybersecurity, and simulation.

Course Title: Networking I

Grade Level: 10

Credits: 5

This course introduces the networking field. Emphasis is on network terminology and protocols, local-area networks, wide-area networks, OSI model, cabling, router programming, Ethernet, IP addressing, and network standards. Upon completion, students should be able to perform tasks related to networking mathematics, terminology, and models; media; Ethernet; subnetting; and TCP/IP Protocols.

Course Title: Computer Science A

Grade Level: 11

Credits: 5

CSA focuses on further developing computational thinking skills through the medium of Android™ App development for mobile platforms. The course utilizes industry-standard tools such as Android Studio, Java™ programming language, XML, and device emulators. Students collaborate to create original solutions to problems of their own choosing by designing and implementing user interfaces and Web-based databases. The course curriculum is a College Board-approved implementation of AP CSA.

Course Title: Networking II

Grade Level: 11

Credits: 5

This course focuses on initial router configuration, router software management, routing protocol configuration, TCP/IP, and access control lists (ACLs). Emphasis will be on the fundamentals of router configuration, managing router software, routing protocol, and access lists. Upon completion, students should have an understanding of routers and their role in WANs, router configuration, routing protocols, TCP/IP, troubleshooting, and ACLs.

Course Title: Cybersecurity

Grade Level: 12

Credits: 5

Cybersecurity (SEC) introduces the tools and concepts of cybersecurity and encourages students to create solutions that allow people to share computing resources while protecting privacy. Nationally, computational resources are vulnerable and frequently attacked; in SEC, students solve problems by understanding and closing these vulnerabilities. This course raises students' knowledge of and commitment to ethical computing behavior. It also aims to develop students' skills as consumers, friends, citizens, and employees who can effectively contribute to communities with a dependable cyber-infrastructure that moves and processes information safely.