EMIS Change 22-45

As required by Ohio Revised Code, the Office of Learning and Instructional Strategies has requested a number of changes to the computer science subject codes in the EMIS Manual and to the Certification/Licensure checks.

4.7 SUBJECT CODES

Technology Section

Table 16. Computer Science Codes (29xxxx)

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
	The following are computer science courses in accordance with Ohio Revised Code §3319.236. ~~The following courses do not earn high school technology credit. This instruction may also be provided by a teacher to multiple groups of students rather than in a self-contained classroom setting. The K-8 content across Ohio's Technology standards defines achievement in meeting the No Child Left Behind 8th Grade Technology Literacy Requirement. Instruction is most effective when integrated with curricular components of other academic content areas.~~		
290245	**Computer Science K-8** Includes content in the appropriate grade range portion of Ohio's Learning Standards for Computer Science.	N/A	—
	~~Computer Science codes include computer/multimedia literacy, software, Internet, systems/networking and programming. All courses should be based on advanced topics aligned with the 9-12 section of the Ohio Technology academic content standards. Credit cannot be given for concepts below 9th – 12th grade.~~		
290250	**Computer Science ~~Principles~~** In this course, students develop an understanding of how computing is used to solve problems and enable innovation across fields and how these solutions can impact society. Students explore using computational thinking skills and tools to solve problems and create artifacts. Effective communication and collaboration skills are developed as students work individually and in group explorations. ~~This course is designed to develop an understanding of the usage and impact of computer science as an innovative computational tool for solving problems in many fields. Effective communication and collaboration skills are developed as students individually and in group explorations solve simulations of real-world problems. The course focuses on the importance of solving problems and the impacts of those solutions to their community, society, and the world.~~	TEC~~, MTH~~	—
290310	**Computer Science with In-Depth Study~~A~~** This course addresses computer science topics that include problem solving strategies, organization of data, algorithmic thinking and programming, analysis of potential solutions and the impacts of computing. The course provides the opportunity for a more in-depth study of selected computer science content. ~~The study of programming methodology with an emphasis on problem solving and algorithm development. Also includes study of data structures and abstraction, but not to the extent as covered in Computer Science AB.~~	TEC~~, MTH~~	—

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
~~290320~~	**~~Computer Science AB~~** ~~Includes all topics of Computer Science A, as well as a more formal and more in-depth study of algorithms, data structures and data abstraction.~~	~~TEC, MTH~~	—
290325	**Specific Topics in Computer Science** This course provides a focused examination of specific computer science topics (e.g., cybersecurity, robotics, data science).	TEC	—
290170	**Networking** In this course, students understand the concepts and use of network servers and devices (e.g., host, firewall, router, switch). Students understand the advantages and disadvantages of network models (e.g., peer-peer, client-server). Content addresses network design fundamentals including network type (e.g., LAN, WAN, MAN). Students also learn the application of network topologies (e.g., Star, bus, hybrid). At an *advanced* level, students design and build simple networks, understand server virtualization and network security. ~~Course includes operating systems, printers/print servers, network configuration and servers, etc.~~	TEC	—
290180	**Computer Service~~Repair~~** This course includes configuration, troubleshooting and repair of network hardware, clients and peripherals. In addition, content should include installation of operating systems including updates, computer security and customer service. ~~Course includes troubleshooting, repair, system/network reconfiguration, help desk practices, etc.~~	TEC	—
299999	**Other Computer Science~~Technology~~** A high school level course that addresses content from the 9-12 section of Ohio's Learning Standards for Computer Science and is different in scope from any of the other Subject Codes described above. ~~A course that is given for High School credit to be applied toward the diploma, but that is different in scope from any of the other SUBJECT CODES described above.~~	TEC	—

Table 17. Information Literacy Codes (20xxxx)

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
	~~The following courses do not earn high school technology credit. This instruction may also be provided by a teacher to multiple groups of students rather than in a self-contained classroom setting. The K-8 content across Ohio's Technology standards defines achievement in meeting the No Child Left Behind 8th Grade Technology Literacy Requirement. Instruction is most effective when integrated with curricular components of other academic content areas.~~		
200910	**Information Literacy K-3** Instruction that includes content in the K-3 portion of Ohio's Learning Standards for ~~t~~Technology ~~academic content standards~~ and library guidelines.	N/A	—

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
200915	**Information Literacy 4-6** Instruction that includes content in the 4-6 portion of Ohio's Learning Standards for tTechnology academic content standards and library guidelines.	N/A	—
200920	**Information Literacy 7-8** Instruction that includes content in the 7-8 portion of Ohio's Learning Standards for tTechnology standards and library guidelines including Iinternet searching, evaluation of Web siteswebsites and other electronic resources.	N/A	—
	Information literacy codes focus on acquisition, interpretation, and dissemination of information. All courses should be based on advanced topics aligned with the 9-12 section of the Ohio Technology academic content standards and Library Guidelines. Credit cannot be given for concepts below 9th – 12th grade.		
200700	**Library Science** Course focuses on how information is organized, accessed, and evaluated, including use of information management systems in school, public, academic, and government libraries.	TEC	—
200905	**Information Literacy** Instruction focuses on recognizing the need for information and developing the skills to locate, evaluate and utilize the information. Learning experiences include information retrieval and critical thinking skills that enable students to acquire, interpret, evaluate, create, and communicate information. Information sources include print, nonprint, electronic, Internet-based resources accessed via the school library, school district, Internet, statewide/national networks, and other providers.	TEC	—

Table 18. Technology Education Codes (10xxxx, 29xxxx)

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
	The following courses do not earn high school technology credit. This instruction may also be provided by a teacher to multiple groups of students rather than in a self-contained classroom setting. The K-8 content across Ohio's Technology standards defines achievement in meeting the No Child Left Behind 8th Grade Technology Literacy Requirement. Instruction is most effective when integrated with curricular components of other academic content areas. The following courses address computer science (29xxxx) as well as Information and Communication Technology (29xxxx) or Technology Education (10xxxx).		

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
101355	**Robotics K-8** Students engage in a design process to manage and control devices through investigative and exploration activities. Products of student work in robotics may be descriptive and/or functional models of technology applications. Students will apply the knowledge and skills necessary to program and operate robots. The students will learn robotic operations and system configurations. Students will code and debug programs using the robotic programming language. This course can also serve as a computer science course.	N/A	—
290200	**Computer ~~Science~~Programming** This course includes the study and use of programming languages (e.g., C++, C#, Java, Python).~~Course includes study and use of programming languages, i.e., BASIC, COBOL, DOS, Visual BASIC, C++, HTML, XML, MSDN, etc. Topics also include operating systems, servers, networks, etc.~~	TEC	—
290160	**Web ~~S~~site Development** This course includes planning, designing and coding webpages to create dynamic, usable websites. Content includes web programming using common design tools, e.g., HTML, XML, CSS, web-based editors. Students study and use web-based protocols, e.g., SFTP, TCP/IP, HTTP, HTTPS. In addition, content includes using tag elements, working with graphics, hypertext links, graphical tables and accessibility methods including Universal Design.~~Course includes Web site design, posting/removing Web sites to/from Web server and Web programming HTML, XML, etc. Course should cover Universal Design and other accessibility methods.~~	TEC	—
~~290165~~	~~**Advanced Web Site Development**~~ ~~Course should include advanced Web programming and applications, Universal Design and other accessibility methods.~~	~~TEC~~	—
101350	**Robotics** Application of processes and knowledge in the design, development, and use of systems to manage and control devices. Products of student work in robotics may be descriptive and/or functional models of technology applications across all systems areas.	TEC	—
102500	**Industrial Computer Applications** Experiences with computer applications across the technological systems areas. Selected activities covering computer hardware, software, and interface device applications to develop understanding of industrial uses of computers.	TEC	—
The following courses address Information and Communication Technology (29xxxx) or Technology Education (10xxxx).			

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
102285	**Technological Literacy K-3** Instruction that includes content in the K-3 portion of Ohio's Learning Standards for Technology. ~~academic content standards for technology.~~ Instruction focuses on skills and knowledge that set the foundation for using a design process to solve problems to meet human/societal needs. Students examine how technology and their world are connected and their own role in technology's impact on self and others. ~~academic content standards for technology.~~	N/A	—
102290	**Technological Literacy 4-6** Instruction that includes content in the 4-6 portion of Ohio's Learning Standards for Technology. ~~academic content standards for technology~~ Instruction focuses on skills and knowledge involved in using a design process to solve problems to meet human/societal needs. Students examine the relationship between technology and society and their own role in technology's impact on self and others. ~~academic content standards for technology.~~	N/A	—
102295	**Technological Literacy 7-8** Instruction that includes content in the 7-8 portion of Ohio's Learning Standards for Technology, ~~academic content standards for technology.~~ Instruction focuses on skills and knowledge involved in using a design process to solve problems to meet human/societal needs. Students examine the relationship between technology and society and their own role in technology's impact on self and others. ~~academic content standards for technology.~~	N/A	—
290035	**Computer/Multimedia Literacy K-3** Instruction that includes content in the K-3 portion of Ohio's Learning Standards for Technology focusing on the use of educational technology for learning. Students develop basic, foundational skills and knowledge for using digital learning tools to access, create, evaluate, apply and communicate ideas and information. ~~academic content standards for technology that focuses on the use of educational technology for learning.~~	N/A	—
290040	**Computer/Multimedia Literacy 4-6** Instruction that ~~I~~includes content in the 4-6 portion of Ohio's Learning Standards for Technology, focusing on the use of educational technology for learning. Students develop skills and knowledge for using digital learning tools to access, create, evaluate, apply and communicate ideas and information. ~~academic content standards for technology that focuses on the use of educational technology for learning.~~	N/A	—

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
290045	**Computer/Multimedia Literacy 7-8** Instruction that includes content in the 7-8 portion of Ohio's Learning Standards for Technology, focusing on the use of educational technology for learning. Students develop skills and knowledge for using digital learning tools to access, create, evaluate, apply and communicate ideas and information.academic content standards for technology including keyboarding, word processing, productivity, communication and information tools.	N/A	—
290050	**Computer/Multimedia Literacy** This Ccourse focuses on advanced concepts in the 9-12 portion of Ohio's Learning Standards for tTechnology academic content standards. Instruction is most effective when integrated or linked to other content areas.	TEC	—
290100	**Technology-Productivity Tools** This Ccourse focuses on advanced concepts in 9-12 portion of Ohio's Learning Standards for tTechnology academic content standards that increase personal productivity and manage information. Instruction is most effective when integrated or linked to other academic areas.	TEC	—
290110	**Technology-Communication Tools** This Ccourse focuses on advanced concepts in the 9-12 portion of Ohio's Learning Standards for tTechnology academic content standards including identifying purpose, audience and communication strategy. Instruction is most effective when integrated or linked to other academic content areas.	TEC	—
290120	**Technology-Problem-Solving Tools** This Ccourse focuses on advanced concepts in the 9-12 portion of Ohio's Learning Standards for tTechnology academic content standards including inquiry/problem-solving skills and technology tools. Instruction is most effective when integrated or linked to other academic content areas.	TEC	—
290130	**Internet Searching** This Ccourse focuses on advanced concepts in the 9-12 portion of Ohio's Learning Standards for tTechnology academic content standards including Iinternet search strategies, search engine ranking methods and Wweb-site evaluation.	TEC	—
290075	**Technology: Electronic Resources** This Ccourse focuses on advanced concepts in the 9-12 portion of Ohio's Learning Standards for tTechnology academic content standards including information literacy concepts and use of technology tools to conduct research. Topics include use of Iinternet and other electronic information resources.	TEC	—
290140	**Technology and Ethics** This cCourse focuses on advanced concepts in the 9-12 portion of Ohio's Learning Standards for tTechnology academic content standards and library guidelines including copyright, intellectual property, biotech and other current ethical concerns.	TEC	—

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
290150	**Computer Graphics** This ~~C~~course includes design techniques used to generate computer graphics. Topics may include use of tools to draw, import, edit, create, animate images, photos, original artwork, etc.	TEC	—
	~~**Technology Education:** A comprehensive study of the knowledge and processes necessary in designing, making, developing, producing, using, managing, and assessing of technological systems and products. Dimensions of technology include assessing impacts and consequences of technology, nature and history of technology, and connections. Technological systems and products are those systems and products that change the world around us to satisfy our needs and wants. In particular Technology Education focuses on the systems and products of the energy/power/transportation, manufacturing, construction, communication, and bio-related/chemical fields. These activities may take place in thematic units at the elementary level, general technology courses at the middle and high school levels, specific high school systems courses, Tech Prep and Pathways courses at the high school level, and modules and problem-based learning integrated with mathematics, science, language arts, social studies and arts teams at all levels.~~		
102300	**Technology Education** Comprehensive action-based courses concerned with the evolution, utilization, and significance of technology and its impact on industry, including its organization, personnel, systems, techniques, resources, products, and socio cultural aspects.	TEC	—
107450	**Foundations of Technology** Prepares students to understand and apply technological concepts and processes that are the cornerstone for the high school technology program. Group and individual activities engage students in creating ideas, developing innovations and engineering practical solutions. Students apply content knowledge from science, mathematics and other areas as they engage with ~~T~~technology content, resources and laboratory/classroom activities ~~apply student applications of science, mathematics and other school subjects in authentic situations~~. This course will focus on the three dimensions of technological literacy: knowledge, ways of thinking and acting, and capabilities, with the goal of students developing the characteristics of technologically literate citizens.	TEC	—
101700	**Research and Development** The study of industrial-technical problems, including provisions for individual or group investigations of problems and opportunities to evaluate their solutions by designing, constructing, and testing products.	TEC	—
101720	**Design** This ~~C~~course includes design topics from the 9-12 portion of Ohio's Learning Standards for ~~t~~Technology ~~academic content standards~~; including identifying and producing a product or system using a design process, ~~and~~ evaluating the final solution, and communicating findings; recognizing the role of teamwork in engineering design and of prototyping in ~~the~~ a design process; and understanding and applying research, development, and experimentation to problem-solving.	TEC	—

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
101730	**Issues and Problems in Technology** The study of themes concerning technology, society, and the environment.	TEC	—
100099	**Other Technology** A high school level course that addresses content from the 9-12 section of Ohio's Learning Standards for Technology and is different in scope from any of the other Subject Codes described above.	TEC	—
	~~**Construction Technology Systems:** A comprehensive study of the knowledge and processes in designing, making, developing, producing, using, managing, and assessing of technological systems and products to build structures on site. In particular courses that are part of the construction technology systems focus on project planning, architectural design and drafting, site preparation, building the structure, and maintaining the structure.~~ The following includes technology education courses (10xxxx) that focus on technology systems for the construction, manufacturing, communication, energy/power/transportation, and bio-related/chemical fields.		
100100	**Construction** The study of the technology and the socioeconomic contributions of those industries concerned with residential, civic industrial, civil, and transportation structures.	TEC	—
100800	**Home Mechanics** The study of the tools, materials, and processes involved in the upkeep and repair of the home, its equipment and devices.	TEC	—
	~~**Manufacturing Technology Systems:** A comprehensive study of the knowledge and processes in designing, making, developing, producing, using, managing, and assessing of technological systems and products in manufacturing facilities. In particular courses that are part of manufacturing technology systems focus on mechanical design and drafting, materials, and processes (including woods, metals, plastics), production, robotics, and automation systems, and specific trades/crafts.~~		
101300	**Manufacturing** The study of the technology and the socioeconomic contributions of industries concerned with the creation of durable consumer products.	TEC	—
101800	**Service Industries** The study of the technology of industries concerned with the maintenance and repair of consumer and/or industrial products.	TEC	—
101900	**Woods Processes** Information and skills concerned with woods, including various manufactured wood products, focusing on the technology employed in the manufacture and construction of products using woods and related factors such as occupations, economics, and consumer information.	TEC	—
101410	**Metals Processes** Information and skills concerned with metals including the products manufactured from metals and the technology employed in the production, processing, and use of metals, as well as related factors such as occupations, economics, and consumer information.	TEC	—

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
101500	**Plastics** Information and skills concerned with the production, processing, and use of plastics, composites and related factors such as occupations, economics, and consumer information.	TEC	—
100200	**Industrial Crafts** Information and skills concerned with handcrafts and the craft industry, including its tools, materials, processes, products, and occupations.	TEC	—
	~~**Communication Technology Systems:** A comprehensive study of the knowledge and process in designing, making, developing, producing, using, managing, and assessing of technological systems to products for transferring graphic and electronic messages. Computer modeling and information technology applications are critical to all technology systems areas. In particular courses that are part of communication technology systems focus on existing and emerging information technologies for encoding, transmitting, receiving, storing, retrieving, and decoding of graphic and electronic messages.~~		
100300	**Drafting** Information and skills concerned with conveying ideas or illustrations graphically through drawings, charts, sketches, maps, and graphs, and the related factors such as the role of drafting in history and industry.	TEC	—
100401	**Electricity/Electronics** Information and skills concerned with electrical energy including theory, applications, and control as it relates to electrically powered equipment, to various kinds of communications equipment, and to related factors such as occupations, economics, and consumer information.	TEC	—
100700	**Graphic Arts** The study of information and skills concerned with graphic reproduction, as well as related factors such as occupations, economics, and consumer information.	TEC	—
102000	**Communications** Provides an introduction to technical communication systems and processes. Students use a variety of technologies and media to create, implement, and evaluate a network to solve a communication problem.	TEC	—
	~~**Energy/Power/Transportation Technology Systems:** A comprehensive study of the knowledge and process in designing, making, developing, producing, using, managing, and assessing of technological systems to produce products for the transmission of energy and power, and the transportation of goods and people. In particular technology courses focus on energy and power sources or devices, the transformation of energy and power from one form to another, the transmission of energy and power from one form to another, and the sale use of power. In addition transportation focuses on the systems and products used to transport goods and people.~~		
101610	**Power Mechanics** Information and skills concerned with the various forms of power, including its generation, transmission, and utilization.	TEC	—

Subject Code	Description	Suggested Subject Area for Credit	Core Subject Area (for proper cert)
102100	**Energy/Power/Transmission** Beginning-level course designed to provide a conceptualized study of basic machines. Students obtain a basic understanding and develop skills needed to identify, build, maintain, test, and develop machines.	TEC	—
	Bio-Related and Chemical Technology Systems: A comprehensive study of the knowledge and process in designing, making, developing, producing, using, managing, and assessing of technological systems to produce products with bio-related and chemical applications. In particular technology courses focus on practical application of biological organism and chemical processes to make or modify products, the production process techniques related to agriculture, chemical, and medical technology products, and the human interface with technology in managing the artificial and natural environment.		
103050	**Bio-Related and Chemical Technology Systems** Comprehensive study of the knowledge and process in designing, making, developing, producing, using, managing, and assessing of technological systems to produce products with bio-related and chemical applications.	TEC	—