

**Career-Technical Credit Transfer (CT)<sup>2</sup>  
Programming Career-Technical Assurance Guide (CTAG)  
March 25, 2016**

The following courses, indicated by a Career-Technical Articulation Number (CTAN), are eligible for postsecondary credit and transfer among Ohio's Public Secondary career-technical institutions and state institutions of higher education. The SCTAI alignment document with ODE competencies and postsecondary learning outcomes is available on the ODHE website at <https://www.ohiohighered.org/transfer/ct2/ctags>.

<b>CTPROG001 - Computer Logic</b>	<b>Credits: 3 Semester Hours</b>
<p><b><u>Advising Notes:</u></b></p> <p>In order to access postsecondary college credit for this CTAN, the student must:</p> <ul style="list-style-type: none"> <li>• Matriculate to an institution of higher education with an approved or comparable program within 3 years of graduating from an approved career-technical education institution.</li> <li>• Successfully complete <u>ODE secondary course <b>Programming (145060)</b></u> and receive a qualifying score of <b>55 or higher</b> on the end-of-course examination.</li> </ul>	<p>Secondary institutions must have pathway approval from the Ohio Department of Education. Certificate of Affirmation assurances are now incorporated into the CTE-26 application process.</p>
<b>CTPROG002 - Java Programming</b>	<b>Credits: 3 Semester Hours</b>
<p><b><u>Advising Notes:</u></b></p> <p><b>Institutions are encouraged to offer the pre-requisite, Computer Logic, before, CTAN CTPROG002- Java Programming</b></p> <p>In order to access postsecondary college credit for this CTAN, the student must:</p> <ul style="list-style-type: none"> <li>• Matriculate to an institution of higher education with an approved or comparable program within 3 years of graduating from an approved career-technical education institution.</li> <li>• Successfully complete <u>ODE secondary course <b>Object Oriented Programming (145065)</b></u> and earn a qualifying score of <b>55 or higher</b> on the end-of-course examination.</li> </ul>	<p>Secondary institutions must have pathway approval from the Ohio Department of Education. Certificate of Affirmation assurances are now incorporated into the CTE-26 application process.</p>

<b>CTPROG003 - C++ Programming</b>	<b>Credits: 3 Semester Hours</b>
<p><b><u>Advising Notes:</u></b></p> <p><b>Institutions are encouraged to offer the pre-requisite, Computer Logic, before, CTAN CTPROG003-C++ Programming</b></p> <p>In order to access postsecondary college credit for this CTAN, the student must:</p> <ul style="list-style-type: none"> <li>• Matriculate to an institution of higher education with an approved or comparable program within 3 years of graduating from an approved career-technical education institution.</li> <li>• Successfully complete ODE secondary course <b><u>Object Oriented Programming (145065)</u></b> and earn a qualifying score of <b><i>55 or higher</i></b> on the end-of-course examination.</li> </ul>	<p>Secondary institutions must have pathway approval from the Ohio Department of Education. Certificate of Affirmation assurances are now incorporated into the CTE-26 application process.</p>
<b>CTIT012 - Microsoft .NET Fundamentals</b>	<b>Credits: 3 Semester Hours</b>
<p><b><u>Advising Notes:</u></b></p> <p>In order to access postsecondary college credit for this CTAN, the student must:</p> <ul style="list-style-type: none"> <li>• Matriculate to an institution of higher education with an approved or comparable program within 3 years of graduating from an approved career-technical education institution.</li> <li>• Successfully complete ODE secondary course <b><u>Visual Programming (145070)</u></b> and earn a qualifying score of <b><i>50 or higher</i></b> on the end-of-course examination <b><u>OR</u></b> provide proof of successful completion of the MTA Exam 98-372 (Microsoft .NET Fundamentals) or current equivalent.</li> </ul>	<p>Secondary institutions must have pathway approval from the Ohio Department of Education. Certificate of Affirmation assurances are now incorporated into the CTE-26 application process.</p>

The CTAN identifies the learning outcomes that are equivalent or common in introductory technical courses. In order for students to receive credit under these agreements, the career-technical secondary programs and the post-secondary institutions must document that their course/program content matches the learning outcomes in the CTANs. In accordance with ORC 3333.162, industry standards and certifications provide documentation of student learning. Recognized industry standards are expectations established by business, industry, state agencies, or professional associations that define training program curricular requirements, establishes certification or licensure criteria, and often serves as the basis for program accreditation.

### Requirements and Credit Conditions:

1. The receiving institution must have a comparable program, major, or courses that have been approved through submission to the Ohio Department of Higher Education (CT)<sup>2</sup> approval process for the CTANs listed in this document.
2. Credits apply to courses in the specified technical area at Ohio's public institutions of higher education, provided that the institution offers courses in the specific technical area. In the absence of an equivalent course, and when the institution offers the technical program, the receiving institution will guarantee to grant and apply an equivalent credit value of the Career-Technical Articulation Number (CTAN) toward the technical requirements of the specific degree/certificate program.
3. The applicant must provide proof to the receiving institution that they successfully completed a course that has been approved through the (CT)<sup>2</sup> approval process and that they earned a qualifying score on the end-of-course examination.
4. A career-technical student seeking credit under the terms of this CTAG must matriculate to an institution of higher education with an approved or comparable program within 3 years of graduating from an approved career-technical education institution.
5. A career-technical student who meets all eligibility criteria will receive the credit hour value for the comparable course(s) as offered at the receiving state institution of higher education.
6. The admission requirements of individual institutions and/or programs are unaffected by the implementation of (CT)<sup>2</sup> outcomes.
7. The transfer of credit through this CTAG will not exempt a student from the residency requirements at the receiving institution

### CTPROG001 – Computer Logic

**Credits: 3 Semester Hours**

**General Course Description:** This course introduces students to the concepts of logic in computer programming design. Students will use tools such as flowcharts and pseudocode to model problem solutions. The course will cover logic structures such as sequencing, selection and looping. Students will also learn about data types, arrays, and using variables for input/output operations. Data validation and program debugging techniques will also be covered.

**Credits:** 3 Semester Hours

#### **Learning Outcomes:**

1. \*Describe the Process of Program Development
2. \*Identify programming languages and their applications
3. \* Use modeling tools such as using pseudocode and/or flowchart to solve programming problems.
4. \* Identify data types and use variables for input and output operations and demonstrate the ability to create logical expressions and mathematical calculations.
5. \* Utilize data structures, such as an array, to store and manipulate a collection of related elements.
6. \* Identify and use conditional logic structures such as decision structures and loops.
7. \* Describe and use error-checking, debugging and data validation.
8. \*Create program documentation
9. \*Create and use functions and modules

***\*Asterisk Indicates Essential Learning Outcomes***

## CTPROG002 – Java Programming

Credits: 3 Semester Hours

**General Course Description:** This course introduces object-oriented concepts such as instantiation, polymorphism, inheritance, and encapsulation. Students will learn how to create classes, objects and methods. Java data types, data structures, and events will be covered. Students will use Java to create console, desktop, and mobile applications.

**Credits:** 3 Semester Hours

### Learning Outcomes:

1. \*Apply object oriented concepts to develop programs, including encapsulation, abstraction, inheritance, polymorphism, and interfaces.
2. \*Use development tools to develop programs
3. \*Create classes, objects, and methods using an object oriented language
4. \*Use primitive and reference data types in computational and string operations
5. \*Use error checking and exception handling in program development
6. \*Debug and test program code
7. \*Test and validate program output
8. \*Use data structures in program development
9. \*Use I/O methods to develop programs
10. \*Write executable object oriented source code

***\*Asterisk Indicates Essential Learning Outcomes***

## CTPROG003 – C++ Programming

Credits: 3 Semester Hours

**General Course Description:** This course introduces object-oriented concepts such as instantiation, polymorphism, inheritance, and encapsulation. Students will learn how to create classes, objects, and member functions. C++ data types, pointers, structures, and arrays will be covered. Students will use C++ to create object oriented console programs.

**Credits:** 3 Semester Hours

### Learning Outcomes:

1. \*Apply object oriented concepts to develop programs
2. \*Use development tools to develop programs
3. \*Create classes, objects, and methods using an object oriented language
4. \*Use primitive and reference data types such as pointers in computational and string operations
5. \*Use error checking and exception handling in program development
6. \*Debug and test program code
7. \*Test and validate program output
8. \*Use data structures in program development

9. \*Use logic structures to develop programs
10. \*Use I/O methods to develop programs
11. \*Produce object oriented source code

***\*Asterisk Indicates Essential Learning Outcomes***

**CTIT012 – Microsoft .NET Fundamentals**

**Credits: 3 Semester Hours**

**General Course Description:** This course uses Visual Basic .NET, as an object-oriented/event-driven environment in which to teach programming concepts. The student will use .NET applications to create and test windows based business programs.

**Credits:** 3 Semester Hours

**Learning Outcomes:**

1. \*Use .NET framework concepts (i. e. basic application settings, variables and constants, basic control structures such as sequence, selection and iteration, event handling and error/exception handling)
2. \*Use namespaces, classes, methods and attributes in the .NET framework
3. \*Compile .NET code
4. \*Use I/O classes in the .NET framework
5. \*Describe .NET security

***\*Asterisk Indicates Essential Learning Outcomes***

**Programming Panel Participants  
Spring 2015**

Bob Haas	Marion Technical Community College	SCTAI Lead Panel Expert
Mary Isabella	Columbus State Community College	SCTAI Lead Panel Expert
Todd Hernandez	Northwest State Community College	SCTAI Panel Expert
Doug Kranch	North Central State College	SCTAI Panel Expert
Yu Liang	Central State University	SCTAI Panel Expert
Russ McMahon	University of Cincinnati	SCTAI Panel Expert
Reece Newman	Sinclair Community College	SCTAI Panel Expert
Leslie Spivey	Edison Community College	SCTAI Panel Expert
Dovel Myers	Shawnee State University	Item Writer
James Reneau	Shawnee State University	Item Writer
Dr. Jim Austin	Center on Education and Training at OSU	
Brooke Parker	Center on Education and Training at OSU	
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Dr. Bob Haas	Ohio Department of Higher Education	SCTAI Staff Expert
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Misty McKee	Ohio Department of Higher Education	Assistant Director of SCTAI
Jessi Spencer	Ohio Department of Higher Education	Administrative Coordinator of SCTAI

