

DESE Model Curriculum: Computer Programming (CIP Code: 11.0103)

GRADE LEVEL/UNIT TITLE: 11-12/Develop Program Algorithms

COURSE INTRODUCTION						
Computer technology skills are vital to business; they permeate the entire workplace. Familiarity with computer programming is required in a growing number of firms and occupations primarily because of the increasingly widespread use of computerized management information systems.						
This course focuses on converting problems into detailed plans, writing code into computer language, testing, monitoring, debugging, documenting and maintaining computer programs. Students will also design programs for specific uses.						
UNIT DESCRIPTION				SUGGESTED UNIT TIMELINE		
Students will learn how to create a program and validate the code.				2 weeks		
				CLASS PERIOD (min.)		
				50 min.		
ESSENTIAL QUESTIONS						
<ol style="list-style-type: none"> 1. What changes with each execution of a program? 2. Why follow standards? 3. Why validate input? 4. What is the benefit of using a method? 						
ESSENTIAL MEASURABLE LEARNING OBJECTIVES	NBEA STANDARD					DOK
1. Use correct syntax and naming conventions of a given programming language	IT-X.3	IT-XIII.2	COMP-V.3	COMP-VI-D.2	COMP-VI-H.2	3
	IT-X.4	IT-XIII.3	COMP-V.4	COMP-VI-D.3	COMP-VI-H.3	
	IT-XI.2	IT-XIII.4	COMP-VI-A.3	COMP-VI-E.3	COMP-VI-H.4	
	IT-XI.3	COMP-I.1	COMP-VI-A.4	COMP-VI-E.4	COMP-VI-I.3	
	IT-XI.4	COMP-II.1	COMP-VI-B.1	COMP-VI-F.2	COMP-VI-I.4	
	IT-XVI.1	COMP-II.2	COMP-VI-B.2	COMP-VI-F.3	COMP-VI-J.3	
	IT-XVI.2	COMP-III.1	COMP-VI-B.3	COMP-VI-F.4	COMP-VI-J.4	
	IT-XVI.3	COMP-III.2	COMP-VI-B.4	COMP-VI-G.1	COMP-VI-K.2	
	IT-XVI.4	COMP-IV.1	COMP-VI-C.1	COMP-VI-G.2	COMP-VI-K.3	
	IT-XIV.1	COMP-IV.2	COMP-VI-C.2	COMP-VI-G.3	COMP-VI-L.3	
	IT-XIV.2	COMP-IV.3	COMP-VI-C.3	COMP-VI-H.1	COMP-VI-M.3	
IT-XIII.1	COMP-V.2	COMP-VI-D.1				

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2. Create a program using internal documentation	IT-X.3 IT-X.4 IT-XI.2 IT-XI.3 IT-XI.4 IT-XVI.1 IT-XVI.2 IT-XVI.3 IT-XVI.4 IT-XIV.1 IT-XIV.2 IT-XIII.1 IT-XIII.2 IT-XIII.3 IT-XIII.4 COMP-I.1	COMP-II.1 COMP-II.2 COMP-III.1 COMP-III.2 COMP-IV.1 COMP-IV.2 COMP-IV.3 COMP-V.2 COMP-V.3 COMP-V.4 COMP-VI-A.3 COMP-VI-A.4 COMP-VI-B.1 COMP-VI-B.2 COMP-VI-B.3 COMP-VI-B.4	COMP-VI-C.1 COMP-VI-C.2 COMP-VI-C.3 COMP-VI-D.1 COMP-VI-D.2 COMP-VI-D.3 COMP-VI-E.3 COMP-VI-E.4 COMP-VI-F.2 COMP-VI-F.3 COMP-VI-F.4 COMP-VI-G.1 COMP-VI-G.2 COMP-VI-G.3 COMP-VI-H.1 COMP-VI-H.2	COMP-VI-H.3 COMP-VI-H.4 COMP-VI-I.3 COMP-VI-I.4 COMP-VI-J.3 COMP-VI-J.4 COMP-VI-K.2 COMP-VI-K.3 COMP-VI-L.3 COMP-VI-M.3 COMM-I.A.1 COMM-I.A.2 COMM-I.A.3 COMM-I.A.4 COMM-I.B.1 COMM-I.B.2	COMM-I.B.3 COMM-I.B.4 COMM-I.C.1 COMM-I.C.2 COMM-I.C.3 COMM-I.C.4 COMM-I.D.1 COMM-I.D.2 COMM-I.D.3 COMM-I.D.4 COMM-III.E.3 COMM-IV.1 COMM-IV.2 COMM-IV.3 COMM-IV.4	4
3. Identify the use and limitations of different data types (integer, double, and constant)						1
4. Create programs that include: variables and constants; counters and accumulators; arithmetic operations and functions; conditional statement; loop instruction; required user input; input validation; opening, writing, and reading from a data file; producing formatted output; modular program using one or more methods; that passes data to methods using parameters	IT-X.3 IT-X.4 IT-XI.2 IT-XI.3 IT-XI.4 IT-XVI.1 IT-XVI.2 IT-XVI.3 IT-XVI.4 IT-XIV.1 IT-XIV.2 IT-XIV.3 IT-XIII.1	IT-XIII.2 IT-XIII.3 IT-XIII.4 COMP-I.1 COMP-II.1 COMP-II.2 COMP-III.1 COMP-III.2 COMP-IV.1 COMP-IV.2 COMP-IV.3 COMP-V.2	COMP-V.3 COMP-V.4 COMP-VI-A.3 COMP-VI-A.4 COMP-VI-B.1 COMP-VI-B.2 COMP-VI-B.3 COMP-VI-B.4 COMP-VI-C.1 COMP-VI-C.2 COMP-VI-C.3 COMP-VI-D.1	COMP-VI-D.2 COMP-VI-D.3 COMP-VI-E.3 COMP-VI-E.4 COMP-VI-F.2 COMP-VI-F.3 COMP-VI-F.4 COMP-VI-G.1 COMP-VI-G.2 COMP-VI-G.3 COMP-VI-H.1	``COMP-VI-H.2 COMP-VI-H.3 COMP-VI-H.4 COMP-VI-I.3 COMP-VI-I.4 COMP-VI-J.3 COMP-VI-J.4 COMP-VI-K.2 COMP-VI-K.3 COMP-VI-L.3 COMP-VI-M.3	4
5. Identify type of errors (e.g. syntax, run-time and logic)	COMM-I.A.1 COMM-I.A.2 COMM-I.A.3 COMM-I.A.4 COMM-I.B.2 COMM-I.B.3 COMM-I.B.4 COMM-I.C.1 COMM-I.C.2 COMM-I.C.3 COMM-I.C.4 COMM-I.D.1 COMM-I.D.2 COMM-I.D.3 COMM-I.D.4 COMM-III.E.3 COMM-IV.1 COMM-IV.2 COMM-IV.3 COMM-IV.4					1

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	COMM-I.B.1					
6. Create a program with a standard graphic user interface (GUI) that includes: objects and menus; and a custom GUI	IT-VII.1	IT-XIV.1	COMP-IV.3	COMP-VI-C.3	COMP-VI-H.1	4
	IT-VII.2	IT-XIV.2	COMP-V.2	COMP-VI-D.1	COMP-VI-H.2	
	IT-VII.3	IT-XIII.1	COMP-V.3	COMP-VI-D.2	COMP-VI-H.3	
	IT-VII.4	IT-XIII.2	COMP-V.4	COMP-VI-D.3	COMP-VI-H.4	
	IT-X.3	IT-XIII.3	COMP-VI-A.3	COMP-VI-E.3	COMP-VI-I.3	
	IT-X.4	IT-XIII.4	COMP-VI-A.4	COMP-VI-E.4	COMP-VI-I.4	
	IT-XI.2	COMP-I.1	COMP-VI-B.1	COMP-VI-F.2	COMP-VI-J.3	
	IT-XI.3	COMP-II.1	COMP-VI-B.2	COMP-VI-F.3	COMP-VI-J.4	
	IT-XI.4	COMP-II.2	COMP-VI-B.3	COMP-VI-F.4	COMP-VI-K.2	
	IT-XVI.1	COMP-III.1	COMP-VI-B.4	COMP-VI-G.1	COMP-VI-K.3	
	IT-XVI.2	COMP-III.2	COMP-VI-C.1	COMP-VI-G.2	COMP-VI-L.3	
	IT-XVI.3	COMP-IV.1	COMP-VI-C.2	COMP-VI-G.3	COMP-VI-M.3	
	IT-XVI.4	COMP-IV.2				
7. Modify an existing program	IT-X.3	IT-XIII.2	COMP-V.3	COMP-VI-D.2	COMP-VI-H.2	
	IT-X.4	IT-XIII.3	COMP-V.4	COMP-VI-D.3	COMP-VI-H.3	
	IT-XI.2	IT-XIII.4	COMP-VI-A.3	COMP-VI-E.3	COMP-VI-H.4	
	IT-XI.3	COMP-I.1	COMP-VI-A.4	COMP-VI-E.4	COMP-VI-I.3	
	IT-XI.4	COMP-II.1	COMP-VI-B.1	COMP-VI-F.2	COMP-VI-I.4	
	IT-XVI.1	COMP-II.2	COMP-VI-B.2	COMP-VI-F.3	COMP-VI-J.3	
	IT-XVI.2	COMP-III.1	COMP-VI-B.3	COMP-VI-F.4	COMP-VI-J.4	
	IT-XVI.3	COMP-III.2	COMP-VI-B.4	COMP-VI-G.1	COMP-VI-K.2	
	IT-XVI.4	COMP-IV.1	COMP-VI-C.1	COMP-VI-G.2	COMP-VI-K.3	
	IT-XIV.1	COMP-IV.2	COMP-VI-C.2	COMP-VI-G.3	COMP-VI-L.3	
	IT-XIV.2	COMP-IV.3	COMP-VI-C.3	COMP-VI-H.1	COMP-VI-M.3	
	IT-XIII.1	COMP-V.2	COMP-VI-D.1			
8. Create a program in collaboration with a team	IT-X.3	COMP-VI-A.3	COMP-VI-J.3	COMM-IV.4	MGMT-VIII-A.3	4
	IT-X.4	COMP-VI-A.4	COMP-VI-J.4	MGMT-IV-A.1	MGMT-VIII-A.4	
	IT-XI.2	COMP-VI-B.1	COMP-VI-K.2	MGMT-IV-A.2	CARDEV-III.A.1	
	IT-XI.3	COMP-VI-B.2	COMP-VI-K.3	MGMT-IV-A.3	CARDEV-III.A.2	
	IT-XI.4	COMP-VI-B.3	COMP-VI-L.3	MGMT-IV-A.4	CARDEV-III.A.3	
	IT-XVI.1	COMP-VI-B.4	COMP-VI-M.3	MGMT-IV-B.1	CARDEV-III.A.4	
	IT-XVI.2	COMP-VI-C.1	COMM-I.A.1	MGMT-IV-B.2	CARDEV-III.B.1	

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	IT-XVI.3	COMP-VI-C.2	COMM-I.A.2	MGMT-IV-B.3	CARDEV-III.B.2	
	IT-XVI.4	COMP-VI-C.3	COMM-I.A.3	MGMT-IV-B.4	CARDEV-III.B.3	
	IT-XIV.1	COMP-VI-D.1	COMM-I.A.4	MGMT-IV-C.3	CARDEV-III.B.4	
	IT-XIV.2	COMP-VI-D.2	COMM-I.B.1	MGMT-IV-C.4	CARDEV-III.C.1	
	IT-XIII.1	COMP-VI-D.3	COMM-I.B.2	MGMT-IV-D.1	CARDEV-III.C.2	
	IT-XIII.2	COMP-VI-E.3	COMM-I.B.3	MGMT-IV-D.2	CARDEV-III.C.3	
	IT-XIII.3	COMP-VI-E.4	COMM-I.B.4	MGMT-IV-D.3	CARDEV-III.C.4	
	IT-XIII.4	COMP-VI-F.2	COMM-I.C.1	MGMT-IV-D.4	CARDEV-III.D.1	
	COMP-I.1	COMP-VI-F.3	COMM-I.C.2	MGMT-IV-E.1	CARDEV-III.D.2	
	COMP-II.1	COMP-VI-F.4	COMM-I.C.3	MGMT-IV-E.2	CARDEV-III.D.3	
	COMP-II.2	COMP-VI-G.1	COMM-I.C.4	MGMT-IV-E.3	CARDEV-III.D.4	
	COMP-III.1	COMP-VI-G.2	COMM-I.D.1	MGMT-IV-E.4	CARDEV-III.E.1	
	COMP-III.2	COMP-VI-G.3	COMM-I.D.2	MGMT-V-A.1	CARDEV-III.E.2	
	COMP-IV.1	COMP-VI-H.1	COMM-I.D.3	MGMT-V-A.2	CARDEV-III.E.3	
	COMP-IV.2	COMP-VI-H.2	COMM-I.D.4	MGMT-V-A.3	CARDEV-III.E.4	
	COMP-IV.3	COMP-VI-H.3	COMM-III.E.3	MGMT-V-B.2	CARDEV-V-B.1	
	COMP-V.2	COMP-VI-H.4	COMM-IV.1	MGMT-V-B.3	CARDEV-V-B.2	
	COMP-V.3	COMP-VI-I.3	COMM-IV.2	MGMT-VIII-A.1	CARDEV-V-B.3	
	COMP-V.4	COMP-VI-I.4	COMM-IV.3	MGMT-VIII-A.2		
9. Describe and practice steps of troubleshooting and debugging	IT-X.3	IT-XIII.2	COMP-V.3	COMP-VI-D.2	COMP-VI-H.2	2
	IT-X.4	IT-XIII.3	COMP-V.4	COMP-VI-D.3	COMP-VI-H.3	
	IT-XI.2	IT-XIII.4	COMP-VI-A.3	COMP-VI-E.3	COMP-VI-H.4	
	IT-XI.3	COMP-I.1	COMP-VI-A.4	COMP-VI-E.4	COMP-VI-I.3	
	IT-XI.4	COMP-II.1	COMP-VI-B.1	COMP-VI-F.2	COMP-VI-I.4	
	IT-XVI.1	COMP-II.2	COMP-VI-B.2	COMP-VI-F.3	COMP-VI-J.3	
	IT-XVI.2	COMP-III.1	COMP-VI-B.3	COMP-VI-F.4	COMP-VI-J.4	
	IT-XVI.3	COMP-III.2	COMP-VI-B.4	COMP-VI-G.1	COMP-VI-K.2	
	IT-XVI.4	COMP-IV.1	COMP-VI-C.1	COMP-VI-G.2	COMP-VI-K.3	
	IT-XIV.1	COMP-IV.2	COMP-VI-C.2	COMP-VI-G.3	COMP-VI-L.3	
	IT-XIV.2	COMP-IV.3	COMP-VI-C.3	COMP-VI-H.1	COMP-VI-M.3	
	IT-XIII.1	COMP-V.2	COMP-VI-D.1			

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ASSESSMENT DESCRIPTIONS	
There are a number of formative and summative labs and projects in the assessment folder. These are summative because they continue to build across the length of the course.	
OBJ. #	INSTRUCTIONAL STRATEGIES
3, 5, 9	1. Lecture
1, 2, 4, 6-8	2. Lecture/demonstration
OBJ. #	INSTRUCTIONAL ACTIVITIES
3, 5	1. Datatypes ppt and hand out for the data elements
1, 2, 4, 6-9	2. Other instructional activities will be based upon the language used. These will be primarily lecture/demonstration
UNIT RESOURCES	