

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

GRADE LEVEL/UNIT TITLE: 11-12/Explore Additional Programming Concepts

<b>COURSE INTRODUCTION</b>						
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.						
<b>UNIT DESCRIPTION</b>				<b>SUGGESTED UNIT TIMELINE</b>		
Students will learn to create efficient, object-oriented programs.						
				<b>CLASS PERIOD (min.)</b>		
<b>ESSENTIAL QUESTIONS</b>						
1. What is the benefit of consistency and simplicity?						
2. What is the benefit of Object-Oriented programming?						
3. Why do you need to identify your user?						
<b>ESSENTIAL MEASURABLE LEARNING OBJECTIVES</b>		<b>NBEA STANDARD</b>				<b>DOK</b>
1. Discuss considerations in programming for efficiency (e.g., computer time, programmer time, etc.)		IT-X.1	COMM-I.A.4	COMM-I.C.2	COMM-I.D.4	3
		IT-X.2	COMM-I.B.1	COMM-I.C.3	COMM-III.E.3	
		IT-X.3	COMM-I.B.2	COMM-I.C.4	COMM-IV.1	
		IT-X.4	COMM-I.B.3	COMM-I.D.1	COMM-IV.2	
		COMM-I.A.1	COMM-I.B.4	COMM-I.D.2	COMM-IV.3	
		COMM-I.A.2	COMM-I.C.1	COMM-I.D.3	COMM-IV.4	
		COMM-I.A.3				
2. Discuss how to create a user-friendly program		IT-X.3	COMP-II.2	COMP-VI-E.3	COMM-I.A.2	3
		IT-X.4	COMP-III.1	COMP-VI-E.4	COMM-I.A.3	
		IT-XI.2	COMP-III.2	COMP-VI-F.2	COMM-I.A.4	
		IT-XI.3	COMP-IV.1	COMP-VI-F.3	COMM-I.B.1	
		IT-XI.4	COMP-IV.2	COMP-VI-F.4	COMM-I.B.2	
		IT-XVI.1	COMP-IV.3	COMP-VI-G.1	COMM-I.B.3	
		IT-XVI.2	COMP-V.2	COMP-VI-G.2	COMM-I.B.4	
		IT-XVI.3	COMP-V.3	COMP-VI-G.3	COMM-I.C.1	
		IT-XVI.4	COMP-V.4	COMP-VI-H.1	COMM-I.C.2	
		IT-VII.1	COMP-VI-A.3	COMP-VI-H.2	COMM-I.C.3	
		IT-VII.2	COMP-VI-A.4	COMP-VI-H.3	COMM-I.C.4	
		IT-VII.3	COMP-VI-B.1	COMP-VI-H.4	COMM-I.D.1	
		IT-VII.4	COMP-VI-B.2	COMP-VI-I.3	COMM-I.D.2	

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	IT-XIV.1	COMP-VI-B.3	COMP-VI-I.4	COMM-I.D.3	
	IT-XIV.2	COMP-VI-B.4	COMP-VI-J.3	COMM-I.D.4	
	IT-XIII.1	COMP-VI-C.1	COMP-VI-J.4	COMM-III.E.3	
	IT-XIII.2	COMP-VI-C.2	COMP-VI-K.2	COMM-IV.1	
	IT-XIII.3	COMP-VI-C.3	COMP-VI-K.3	COMM-IV.2	
	IT-XIII.4	COMP-VI-D.1	COMP-VI-L.3	COMM-IV.3	
	COMP-I.1	COMP-VI-D.2	COMP-VI-M.3	COMM-IV.4	
	COMP-II.1	COMP-VI-D.3	COMM-I.A.1		
3. Describe event-driven programming	IT-X.3	COMP-IV.1	COMP-VI-F.2	COMM-I.A.3	1
	IT-X.4	COMP-IV.2	COMP-VI-F.3	COMM-I.A.4	
	IT-XI.2	COMP-IV.3	COMP-VI-F.4	COMM-I.B.1	
	IT-XI.3	COMP-V.2	COMP-VI-G.1	COMM-I.B.2	
	IT-XI.4	COMP-V.3	COMP-VI-G.2	COMM-I.B.3	
	IT-XVI.1	COMP-V.4	COMP-VI-G.3	COMM-I.B.4	
	IT-XVI.2	COMP-VI-A.3	COMP-VI-H.1	COMM-I.C.1	
	IT-XVI.3	COMP-VI-A.4	COMP-VI-H.2	COMM-I.C.2	
	IT-XVI.4	COMP-VI-B.1	COMP-VI-H.3	COMM-I.C.3	
	IT-XIV.1	COMP-VI-B.2	COMP-VI-H.4	COMM-I.C.4	
	IT-XIV.2	COMP-VI-B.3	COMP-VI-I.3	COMM-I.D.1	
	IT-XIII.1	COMP-VI-B.4	COMP-VI-I.4	COMM-I.D.2	
	IT-XIII.2	COMP-VI-C.1	COMP-VI-J.3	COMM-I.D.3	
	IT-XIII.3	COMP-VI-C.2	COMP-VI-J.4	COMM-I.D.4	
	IT-XIII.4	COMP-VI-C.3	COMP-VI-K.2	COMM-III.E.3	
	COMP-I.1	COMP-VI-D.1	COMP-VI-K.3	COMM-IV.1	
	COMP-II.1	COMP-VI-D.2	COMP-VI-L.3	COMM-IV.2	
	COMP-II.2	COMP-VI-D.3	COMP-VI-M.3	COMM-IV.3	
	COMP-III.1	COMP-VI-E.3	COMM-I.A.1	COMM-IV.4	
	COMP-III.2	COMP-VI-E.4	COMM-I.A.2		
4. Describe error catching/handling	IT-X.3	COMP-IV.1	COMP-VI-F.2	COMM-I.A.3	1
	IT-X.4	COMP-IV.2	COMP-VI-F.3	COMM-I.A.4	
	IT-XI.2	COMP-IV.3	COMP-VI-F.4	COMM-I.B.1	
	IT-XI.3	COMP-V.2	COMP-VI-G.1	COMM-I.B.2	
	IT-XI.4	COMP-V.3	COMP-VI-G.2	COMM-I.B.3	
	IT-XVI.1	COMP-V.4	COMP-VI-G.3	COMM-I.B.4	
	IT-XVI.2	COMP-VI-A.3	COMP-VI-H.1	COMM-I.C.1	

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	IT-XVI.3	COMP-VI-A.4	COMP-VI-H.2	COMM-I.C.2	
	IT-XVI.4	COMP-VI-B.1	COMP-VI-H.3	COMM-I.C.3	
	IT-XIV.1	COMP-VI-B.2	COMP-VI-H.4	COMM-I.C.4	
	IT-XIV.2	COMP-VI-B.3	COMP-VI-I.3	COMM-I.D.1	
	IT-XIII.1	COMP-VI-B.4	COMP-VI-I.4	COMM-I.D.2	
	IT-XIII.2	COMP-VI-C.1	COMP-VI-J.3	COMM-I.D.3	
	IT-XIII.3	COMP-VI-C.2	COMP-VI-J.4	COMM-I.D.4	
	IT-XIII.4	COMP-VI-C.3	COMP-VI-K.2	COMM-III.E.3	
	COMP-I.1	COMP-VI-D.1	COMP-VI-K.3	COMM-IV.1	
	COMP-II.1	COMP-VI-D.2	COMP-VI-L.3	COMM-IV.2	
	COMP-II.2	COMP-VI-D.3	COMP-VI-M.3	COMM-IV.3	
	COMP-III.1	COMP-VI-E.3	COMM-I.A.1	COMM-IV.4	
	COMP-III.2	COMP-VI-E.4	COMM-I.A.2		
5. Compare object-oriented programming with structured programming	IT-X.3	COMP-IV.1	COMP-VI-F.2	COMM-I.A.3	3
	IT-X.4	COMP-IV.2	COMP-VI-F.3	COMM-I.A.4	
	IT-XI.2	COMP-IV.3	COMP-VI-F.4	COMM-I.B.1	
	IT-XI.3	COMP-V.2	COMP-VI-G.1	COMM-I.B.2	
	IT-XI.4	COMP-V.3	COMP-VI-G.2	COMM-I.B.3	
	IT-XVI.1	COMP-V.4	COMP-VI-G.3	COMM-I.B.4	
	IT-XVI.2	COMP-VI-A.3	COMP-VI-H.1	COMM-I.C.1	
	IT-XVI.3	COMP-VI-A.4	COMP-VI-H.2	COMM-I.C.2	
	IT-XVI.4	COMP-VI-B.1	COMP-VI-H.3	COMM-I.C.3	
	IT-XIV.1	COMP-VI-B.2	COMP-VI-H.4	COMM-I.C.4	
	IT-XIV.2	COMP-VI-B.3	COMP-VI-I.3	COMM-I.D.1	
	IT-XIII.1	COMP-VI-B.4	COMP-VI-I.4	COMM-I.D.2	
	IT-XIII.2	COMP-VI-C.1	COMP-VI-J.3	COMM-I.D.3	
	IT-XIII.3	COMP-VI-C.2	COMP-VI-J.4	COMM-I.D.4	
	IT-XIII.4	COMP-VI-C.3	COMP-VI-K.2	COMM-III.E.3	
	COMP-I.1	COMP-VI-D.1	COMP-VI-K.3	COMM-IV.1	
	COMP-II.1	COMP-VI-D.2	COMP-VI-L.3	COMM-IV.2	
	COMP-II.2	COMP-VI-D.3	COMP-VI-M.3	COMM-IV.3	
	COMP-III.1	COMP-VI-E.3	COMM-I.A.1	COMM-IV.4	
	COMP-III.2	COMP-VI-E.4	COMM-I.A.2		

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6. Describe and/or practice mobile application programming	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	3
7. Discuss handicap accessibility considerations in programming	IT-IV.1 IT-IV.2 IT-IV.3 IT-IV.4 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 IT-XV.1 IT-XV.2 IT-XV.3	IT-XV.4 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	3
8. Create a program using multimedia	IT-VI.1 IT-VI.2 IT-VI.3 IT-VI.4	IT-XIII.2 IT-XIII.3 IT-XIII.4 COMP-I.1	COMP-VI-B.1 COMP-VI-B.2 COMP-VI-B.3 COMP-VI-B.4	COMP-VI-G.1 COMP-VI-G.2 COMP-VI-G.3 COMP-VI-H.1	4

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	IT-X.3	COMP-II.1	COMP-VI-C.1	COMP-VI-H.2	
	IT-X.4	COMP-II.2	COMP-VI-C.2	COMP-VI-H.3	
	IT-XI.2	COMP-III.1	COMP-VI-C.3	COMP-VI-H.4	
	IT-XI.3	COMP-III.2	COMP-VI-D.1	COMP-VI-I.3	
	IT-XI.4	COMP-IV.1	COMP-VI-D.2	COMP-VI-I.4	
	IT-XVI.1	COMP-IV.2	COMP-VI-D.3	COMP-VI-J.3	
	IT-XVI.2	COMP-IV.3	COMP-VI-E.3	COMP-VI-J.4	
	IT-XVI.3	COMP-V.2	COMP-VI-E.4	COMP-VI-K.2	
	IT-XVI.4	COMP-V.3	COMP-VI-F.2	COMP-VI-K.3	
	IT-XIV.1	COMP-V.4	COMP-VI-F.3	COMP-VI-L.3	
	IT-XIV.2	COMP-VI-A.3	COMP-VI-F.4	COMP-VI-M.3	
	IT-XIII.1	COMP-VI-A.4			
9. Practice programming for efficiency	IT-X.3	COMP-I.1	COMP-VI-B.3	COMP-VI-G.2	4
	IT-X.4	COMP-II.1	COMP-VI-B.4	COMP-VI-G.3	
	IT-XI.2	COMP-II.2	COMP-VI-C.1	COMP-VI-H.1	
	IT-XI.3	COMP-III.1	COMP-VI-C.2	COMP-VI-H.2	
	IT-XI.4	COMP-III.2	COMP-VI-C.3	COMP-VI-H.3	
	IT-XVI.1	COMP-IV.1	COMP-VI-D.1	COMP-VI-H.4	
	IT-XVI.2	COMP-IV.2	COMP-VI-D.2	COMP-VI-I.3	
	IT-XVI.3	COMP-IV.3	COMP-VI-D.3	COMP-VI-I.4	
	IT-XVI.4	COMP-V.2	COMP-VI-E.3	COMP-VI-J.3	
	IT-XIV.1	COMP-V.3	COMP-VI-E.4	COMP-VI-J.4	
	IT-XIV.2	COMP-V.4	COMP-VI-F.2	COMP-VI-K.2	
	IT-XIII.1	COMP-VI-A.3	COMP-VI-F.3	COMP-VI-K.3	
	IT-XIII.2	COMP-VI-A.4	COMP-VI-F.4	COMP-VI-L.3	
	IT-XIII.3	COMP-VI-B.1	COMP-VI-G.1	COMP-VI-M.3	
	IT-XIII.4	COMP-VI-B.2			
10. Practice error catching/handling	IT-X.3	COMP-I.1	COMP-VI-B.3	COMP-VI-G.2	4
	IT-X.4	COMP-II.1	COMP-VI-B.4	COMP-VI-G.3	
	IT-XI.2	COMP-II.2	COMP-VI-C.1	COMP-VI-H.1	
	IT-XI.3	COMP-III.1	COMP-VI-C.2	COMP-VI-H.2	
	IT-XI.4	COMP-III.2	COMP-VI-C.3	COMP-VI-H.3	
	IT-XVI.1	COMP-IV.1	COMP-VI-D.1	COMP-VI-H.4	
	IT-XVI.2	COMP-IV.2	COMP-VI-D.2	COMP-VI-I.3	
	IT-XVI.3	COMP-IV.3	COMP-VI-D.3	COMP-VI-I.4	

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	IT-XVI.4	COMP-V.2	COMP-VI-E.3	COMP-VI-J.3	
	IT-XIV.1	COMP-V.3	COMP-VI-E.4	COMP-VI-J.4	
	IT-XIV.2	COMP-V.4	COMP-VI-F.2	COMP-VI-K.2	
	IT-XIII.1	COMP-VI-A.3	COMP-VI-F.3	COMP-VI-K.3	
	IT-XIII.2	COMP-VI-A.4	COMP-VI-F.4	COMP-VI-L.3	
	IT-XIII.3	COMP-VI-B.1	COMP-VI-G.1	COMP-VI-M.3	
	IT-XIII.4	COMP-VI-B.2			
<b>OBJ. #</b>	<b>INSTRUCTIONAL STRATEGIES</b>				
8, 4	1. Lecture, Independent Learning				
2, 4, 6, 7	2. Lecture, Demonstration, Independent Learning				
1, 3, 5, 10	3. Lecture, Lab				
<b>OBJ. #</b>	<b>INSTRUCTIONAL ACTIVITIES</b>				
8, 9	1. GUI Programming - Web Site Design video from Cambridge Education – Guide included also guistandards.pdf for lecture/discussion				
2, 4, 6, 7	2. Accessibility lecture, demonstration, research and discussion (AccessibilityConsiderations.pdf, Guidelines for accessibility.docx)				
1, 3, 5, 10	3. Event Driven programming lecture/programming (Event.DrivenProgrammingpdf.pdf and OOP vs Structures)				