

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

GRADE LEVEL/UNIT TITLE: 11-12/Apply Data Structures 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 how to create organized data structures.						
					<b>CLASS PERIOD (min.)</b>	
<b>ESSENTIAL QUESTIONS</b>						
1. What is a data structure?						
2. What is the benefit of a Database compared to a File?						
3. Why is it important to create efficient data structures?						
<b>ESSENTIAL MEASURABLE LEARNING OBJECTIVES</b>		<b>NBEA STANDARD</b>				<b>DOK</b>
1. Create a program using a list		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					

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2. Create a program using one- and two-dimensional arrays	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	4
3. Create a program using a sort routine	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	4

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4. Create file structures	IT-IX.1 IT-IX.2 IT-IX.3 IT-IX.4	4
5. Describe database structures (e.g., fields, records, files, and tables)	IT-IX.1          COMM-I.A.4      COMM-I.C.3      COMM-III.E.3 IT-IX.2          COMM-I.B.1      COMM-I.C.4      COMM-IV.1 IT-IX.3          COMM-I.B.2      COMM-I.D.1      COMM-IV.2 IT-IX.4          COMM-I.B.3      COMM-I.D.2      COMM-IV.3 COMM-I.A.1      COMM-I.B.4      COMM-I.D.3      COMM-IV.4 COMM-I.A.2      COMM-I.C.1      COMM-I.D.4 COMM-I.A.3      COMM-I.C.2	1
6. Write code to append, delete, and update a table or a file	IT-IX.1          IT-XIII.2          COMP-VI-B.1      COMP-VI-G.1 IT-IX.2          IT-XIII.3          COMP-VI-B.2      COMP-VI-G.2 IT-IX.3          IT-XIII.4          COMP-VI-B.3      COMP-VI-G.3 IT-IX.4          COMP-I.1          COMP-VI-B.4      COMP-VI-H.1 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	4
7. Create a database file with one or more tables for manipulation by program code	IT-IX.1 IT-IX.2 IT-IX.3 IT-IX.4	4

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8. Write code to search, sort, and query a data structure	IT-IX.1 IT-IX.2 IT-IX.3 IT-IX.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 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
<b>OBJ. #</b>	<b>INSTRUCTIONAL STRATEGIES</b>				
2, 5, 6-8	1. Lecture, Discussion				
4	2. Lecture, Discussion				
1, 3	3. Lecture				
<b>OBJ. #</b>	<b>INSTRUCTIONAL ACTIVITIES</b>				
2, 5, 6-8	1. Database Terminology lecture/discussion				
4	2. SQL Lecture discussion				
1, 3	3. Other programming concepts based upon the language				