

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

GRADE LEVEL/UNIT TITLE: 11-12/Apply Logical Problem-Solving Skills

| 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 programming principles to solve problems. | | | | 2 weeks | | |
| | | | | CLASS PERIOD (min.) | | |
| | | | | 50 min. | | |
| ESSENTIAL QUESTIONS | | | | | | |
| 1. What is the relationship of problem solving to computer programming? | | | | | | |
| 2. What is outcome of problem solving? | | | | | | |
| 3. What is the benefit of reusable components? | | | | | | |
| ESSENTIAL MEASURABLE LEARNING OBJECTIVES | | NBEA STANDARD | | | DOK | |
| 1. Analyze a problem | | IT-X.3 | COMM-I.C.2 | COMP-V.2 | MGMT-I.D.3 | 4 |
| | | IT-X.4 | COMM-I.C.3 | COMP-V.3 | ENT-II.B.1 | |
| | | COMM-I.A.1 | COMM-I.C.4 | COMP-V.4 | ENT-II.B.2 | |
| | | COMM-I.A.2 | COMP-I.1 | MGMT-I.A.1 | ENT-II.C.1 | |
| | | COMM-I.A.3 | COMP-II.1 | MGMT-I.A.2 | ENT-II.C.2 | |
| | | COMM-I.A.4 | COMP-II.2 | MGMT-I.A.3 | ENT-VI.D.1 | |
| | | COMM-I.B.1 | COMP-III.1 | MGMT-I.B.1 | ENT-VI.D.2 | |
| | | COMM-I.B.2 | COMP-III.2 | MGMT-I.B.2 | ENT-VI.D.3 | |
| | | COMM-I.B.3 | COMP-IV.1 | MGMT-I.B.3 | ENT-IX.1 | |
| | | COMM-I.B.4 | COMP-IV.2 | MGMT-I.D.1 | ENT-IX.2 | |
| COMM-I.C.1 | COMP-IV.3 | MGMT-I.D.2 | | | | |
| 2. Determine the steps needed to solve a problem | | IT-X.3 | COMP-III.2 | COMP-V.4 | MGMT-I.B.2 | 3 |
| | | IT-X.4 | COMP-IV.1 | MGMT-I.A.1 | MGMT-I.B.3 | |
| | | COMP-I.1 | COMP-IV.2 | MGMT-I.A.2 | MGMT-I.D.1 | |
| | | COMP-II.1 | COMP-IV.3 | MGMT-I.A.3 | MGMT-I.D.2 | |
| | | COMP-II.2 | COMP-V.2 | MGMT-I.B.1 | MGMT-I.D.3 | |
| | | COMP-III.1 | COMP-V.3 | | | |

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|---|--|--|--|--|-------------------------|
| <p>3. Create an algorithm to solve a problem</p> | <p>IT-X.3 IT-X.4 IT-XI.2 IT-XI.3 IT-XI.4 IT-XIII.2 IT-XIII.3 IT-XIII.4 COMP-I.1 COMP-II.1 COMP-II.2 COMP-III.1 COMP-III.2</p> | <p>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</p> | <p>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</p> | <p>COMP-VI.G.3 COMP-VI.H.1 COMP-VI.H.2 COMP-VI.H.3 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</p> | <p align="center">4</p> |
| <p>4. Illustrate the problem solution using a storyboard, flowchart or pseudocode</p> | <p>IT-I.1 IT-I.2 IT-I.3 IT-I.4 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-XIII.2 IT-XIII.3 IT-XIII.4</p> | <p>IT-XVIII.1 IT-XVIII.2 IT-XVIII.3 IT-XVIII.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</p> | <p>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</p> | <p>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.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</p> | <p align="center">3</p> |

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|--|--|---|--|---|---|
| 5. Build a program from a storyboard, flowchart, or pseudocode | 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-XIII.2 IT-XIII.3 IT-XIII.4 IT-XVIII.1 IT-XVIII.2 IT-XVIII.3 | IT-XVIII.4 MGMT-IV.A.1 MGMT-IV.A.2 MGMT-IV.A.3 MGMT-IV.A.4 MGMT-IV.B.1 MGMT-IV.B.2 | MGMT-IV.B.3 MGMT-VIII.A.1 MGMT-VIII.A.2 MGMT-VIII.A.3 MGMT.VIII.A.4 MGMT-XI.A.3 MGMT-XI.A.4 | 4 |
| 6. Explain how to create and integrate reusable component into a program | IT-I.1 IT-I.2 IT-I.3 IT-I.4 IT-X.3 IT-X.4 IT-XI.2 IT-XI.3 IT-XI.4 IT-XIII.2 IT-XIII.3 IT-XIII.4 IT-XVIII.1 IT-XVIII.2 IT-XVIII.3 IT-XVIII.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 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.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 | 3 |
| 7. Explain how a program is tested and accepted for release | IT-I.1 IT-I.2 IT-I.3 IT-I.4 IT-X.3 IT-X.4 IT-XI.2 | IT-XI.3 IT-XI.4 IT-XVIII.1 IT-XVIII.2 IT-XVIII.3 IT-XVIII.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 | 3 |

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|------------------|---|---|
| 8. Document code | IT-XI.2 IT-XI.3 IT-XI.4 | 2 |
| OBJ. # | INSTRUCTIONAL STRATEGIES | |
| 3-6 | 1. Lecture/demonstration; Independent Learning | |
| 1, 2 | 2. Lecture | |
| 7 | 3. Cooperative Learning | |
| 8 | 4. Independent Learning | |
| OBJ. # | INSTRUCTIONAL ACTIVITIES | |
| 3-6 | 1. Lecture/demonstration on flow charting, pseudo-code, storyboards and other design techniques | |
| 1, 2 | 2. Lecture on problem solving and user requirements gathering | |
| 8 | 3. Students use different techniques to design simple systems (i.e. wake up and get to school and attached mazes) | |
| 7 | 4. Documentation of code will be dependent upon the programming language | |