

## Instructional Materials Evaluation Criteria – Computer Programming II

**Title** \_\_\_\_\_ **ISBN#** \_\_\_\_\_

**Established Track Record? YES**  **NO**

If yes, please list research source(s):

**Meets National Standards? YES**  **NO**

**Standard I: Students will develop applications which make advanced use of the skills and concepts developed in Computer Programming I.**

Objectives	Covered Yes/No	Comments on Coverage	Percentage of Coverage
<p><b>Demonstrate the ability to develop advanced applications.</b></p> <ul style="list-style-type: none"> <li>• <b>Develop advanced applications using input, calculations, and output.</b></li> <li>• <b>Develop advanced applications using IF structures.</b></li> <li>• <b>Develop advanced applications using iteration.</b></li> <li>• <b>Develop advanced applications using sub-programs.</b></li> <li>• <b>Develop advanced applications in object-oriented programming</b></li> <li>• <b>Develop advanced applications using recursion.</b></li> <li>• <b>Develop advanced applications using arrays.</b></li> <li>• <b>Develop advanced applications projects.</b></li> <li>• <b>Sort arrays using binary (<math>n \log n</math>) sorts.</b></li> <li>• <b>Develop advanced applications</b></li> </ul>			

using files (random access files) or a simple database.			
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**Standard II: Students will use more efficient searching and sorting algorithms.**

Objectives	Covered Yes/No	Comments on Coverage	Percentage of Coverage
<b>Demonstrate the ability to search data structures in programs.</b> <ul style="list-style-type: none"> <li>• Develop a binary search.</li> <li>• Develop a hash search including best and worst, average and hash searches.</li> <li>• Compare efficiency of sequential and binary searches.</li> </ul>			
<b>Demonstrate the ability to sort data structures in programs.</b> <ul style="list-style-type: none"> <li>• Sort arrays using quadratic (<math>n^2</math>) sorts.</li> <li>• Sort arrays using binary (<math>n \log n</math>) sorts.</li> <li>• Compare the efficiency of the various sorts using BigO notation including best, worst and average.</li> </ul>			

**Standard III: Students will implement and manipulate a simple database.**

Objectives	Covered Yes/No	Comments on Coverage	Percentage of Coverage
<b>Demonstrate the ability to use random access files in programs.</b> <ul style="list-style-type: none"> <li>• Create and initialize random access files.</li> </ul>			

<ul style="list-style-type: none"> <li>• <b>Read data from random access files.</b></li> <li>• <b>Update random access files.</b></li> <li>• <b>Index random access files.</b></li> <li>• <b>Utilize hashing on random access files.</b></li> </ul>			
<b>Standard IV: Students will properly employ dynamic data structures and abstract data types (ADTs).</b>			
Objectives	Covered Yes/No	Comments on Coverage	Percentage of Coverage
<p><b>Demonstrate the ability to use linked lists in programs.</b></p> <ul style="list-style-type: none"> <li>• <b>Declare pointer identifiers.</b></li> <li>• <b>Insert nodes into a linked list (front, middle, end).</b></li> <li>• <b>Delete nodes from a linked list (front, middle, end).</b></li> <li>• <b>Output the values in a linked list.</b></li> <li>• <b>Search for a value in a linked list.</b></li> <li>• <b>Use header and non-header linked lists.</b></li> <li>• <b>Perform other linked list operations.</b></li> <li>• <b>Develop linked list applications.</b></li> </ul>			
<p><b>Demonstrate the ability to use stacks (arrays and linked lists) in programs.</b></p> <ul style="list-style-type: none"> <li>• <b>Declare stack structures.</b></li> <li>• <b>Initialize stacks.</b></li> <li>• <b>Check for empty and full stacks</b></li> <li>• <b>Push on to and pop off values from stacks.</b></li> <li>• <b>Develop stack applications.</b></li> </ul>			

<p><b>Demonstrate the ability to use queues (arrays and linked lists) in programs.</b></p> <ul style="list-style-type: none"> <li>• <b>Declare queue structures.</b></li> <li>• <b>Check for empty and full queues.</b></li> <li>• <b>Initialize queues.</b></li> <li>• <b>Enqueue values on to and dequeue values off of queues.</b></li> <li>• <b>Develop queue applications.</b></li> </ul>			
<p><b>Demonstrate the ability to use binary trees in programs.</b></p> <ul style="list-style-type: none"> <li>• <b>Declare pointer identifiers.</b></li> <li>• <b>Create binary tree nodes identifiers.</b></li> <li>• <b>Insert nodes into a binary tree.</b></li> <li>• <b>Delete nodes from a binary tree.</b></li> <li>• <b>Output the values in a binary tree.</b></li> <li>• <b>Search for values in ordered binary trees.</b></li> <li>• <b>Develop binary tree applications.</b></li> </ul>			
<p><b>Standard V: Students will design and implement classes using inheritance and composition.</b></p>			
Objectives	Covered Yes/No	Comments on Coverage	Percentage of Coverage
<p><b>Create user-defined inherited classes.</b></p>			
<p><b>Demonstrate overloading techniques.</b></p> <ul style="list-style-type: none"> <li>• <b>Demonstrate function overloading.</b></li> <li>• <b>Demonstrate operator overloading (C++ only)</b></li> </ul>			

**Standard VI: Students will develop an individual program of significant complexity and size (300-500 lines).**

Objectives	Covered Yes/No	Comments on Coverage	Percentage of Coverage
Create an individual program of significant complexity and size (300-500 lines).			
Compile a portfolio of the individual and group programs developed during the course.			

**Standard VII: Students will participate in a work-based learning experience and/or competition.**

Objectives	Covered Yes/No	Comments on Coverage	Percentage of Coverage
<p>Participate in a work-based learning experience.</p> <ul style="list-style-type: none"> <li>• Field trip to a software engineering firm</li> <li>• Job shadow</li> <li>• Internship</li> <li>• Industry guest speaker</li> <li>• Post-secondary guest speaker</li> <li>• Industry interview</li> </ul>			
<p>Participate at a student programming competition.</p> <ul style="list-style-type: none"> <li>• University of Utah High School Computer Programming Contest</li> <li>• Utah State University High School Computer Programming Contest</li> <li>• Utah Valley State College Technology Fair (robotics)</li> </ul>			



<b>Curriculum Coverage</b>					<b>N/A</b>
Content	Accurate information reflecting current knowledge.  No content bias.	Some inaccuracies found, however, information reflects current knowledge.  No content bias.	Many inaccuracies were found on concepts.  Content bias created problems with concepts.	Major inaccuracies found in content or concepts.	
Age Appropriate	A wide range of activities to accommodate various developmental levels at a reasonable pace and depth of coverage.  Includes age appropriate cross-curricular references (e.g., literature, software, etc.)  Content organized so prerequisite skills and knowledge are developed before more complex skills.	Some activities are adaptable to the appropriate age level.  Some cross-curricular activities are given.  Some attention given to prerequisite skills and knowledge.	Limited developmentally appropriate activities.  Prerequisite skills and prior knowledge are not sufficiently developed before more complex concepts are introduced.	Age appropriate issues are not addressed.  Several activities are not based on appropriate levels.	
<b>Physical Qualities</b>					<b>N/A</b>
Durability	Materials are securely bound and reinforced.	Materials are hardbound adequately.	Materials have secure binding.	Materials have inferior binding.	
Print Size and legibility for intended grade level	Appropriate use of font size and format for intended grade level.	Font size adequate for intended grade level.	Font size and format too small or too large for age group.	Font size inconsistent.	
	Key words or phrases bold faced and/or italicized.	Some key words or phrases boldfaced and/or italicized.	Highlighting was used too much, emphasized too much information.	No key words or phrases boldfaced or italicized.	
Pictures, tables, and graphics	Appropriate and varied pictures, tables, and graphs.  Graphs and tables are correctly labeled (e.g., titles, keys, labels).	Limited pictures, tables, and graphs.  Some tables and graphs are not labeled correctly.	Very limited pictures, tables, and graphs.	Inappropriate pictures, tables, and graphs.	
Includes table of content, glossaries, and index	Tables of contents, indices, glossaries, content summaries, and assessment guides are designed to help teachers, parents/guardians, and students.  Clearly represents concepts within the text.	Tables of contents, indices, glossaries, content summaries, and assessment guides are designed to help teachers, parents/guardians, and students, are adequate but not clearly defined concepts within the text.	Simple tables of contents, indices, glossaries, content summaries, and assessment guides are included.	Is missing one or more of the following: simple table of contents, glossaries, content summaries, assessment guides, or indices.	

<b>Technology</b>					<b>N/A</b>
Ease of Use	Menus are easy to read and follow.	Menus are generally easy to read and follow.	Menus are easy to read. Might have to read manual to understand operation of technology. (e.g., laser remote, software.)	Menus are not very descriptive. Hard to follow.	
	User-friendly installation requires a minimal level of computer expertise.	Installation requires little computer expertise.	Installation requires some knowledge or expertise.	Installation requires expertise.	
	Manual and directions are understandable.	Manuals and directions are simple.	Manuals are included.	No manuals or written instructional materials are provided.	
Audio/Visual attributes	High quality audio and visuals are correct and contribute to overall effectiveness of program.	Audio and visuals are of good quality. Complements program effectiveness.	Audio and visuals are acceptable. Aligned with program content.	Audio and visual defects are apparent. Distracts from program content.	
	Information is current and up-to-date.	Information is current.	Information is mostly current.	Information is out-of-date.	
Enhances learning experience	Enhances learning experience. Adds depth and diversity.	Offers some additional depth and diversity to learning experience.	Mild impact to overall learning experience.	Does not impact learning experience.	
<b>Universal Access</b>					<b>N/A</b>
Content accurately reflects diverse population	Provides ways to adapt curriculum for all students (e.g., special needs, learning difficulties, English language learners, advanced learners.)	Provides some ways to adapt curriculum to meet assessed special needs.	Provides limited strategies to assist special needs students.	Inappropriate strategies to assist special needs students.	
	Accurate portrayal of cultural, racial, and religious diversity in society.	Mostly accurate portrayal of cultural, racial, and religious diversity in society.	Does not address diversity in society.	Inaccurate portrayal of diverse populations and society.	
<b>Assessment</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>N/A</b>
Provides a variety of assessment options	Multiple measurements of individual student progress at regular intervals ensuring success of all students.	Assessment requires students to apply some concepts.	Assessment requires students to apply few concepts.	Provides only paper and pencil assessment.	