Subject:	Computer Science	**Course/Grade Level:**	User Interface Design / 11th-12th
Focus Statement:	Students will create user interfaces and critique the user interfaces of existing programs. Students will also evaluate user interfaces using a variety of techniques.		

Outcome 1:

CTE.UID.1		**Students will explain how user interfaces are effective.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.1.1	List various affordances in everyday life and software applications.
NA	NA	CTE.UID.1.2	Show how inconsistency with user affordances can lead to bad user interface design.
NA	NA	CTE.UID.1.3	Show how shortcuts can help frequent users of a user interface.
NA	NA	CTE.UID.1.4	Show how to avoid mode errors that are difficult to recover from.
NA	NA	CTE.UID.1.5	Know the five dimensions of usability: learnability, efficiency, visibility, errors, and satisfaction.

Outcome 2:

CTE.UID.2		**Students will show how a user interface design is easy to learn.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.2.1	Show good examples of skeuomorphism is a user interface.
NA	NA	CTE.UID.2.2	Show examples of how skeuomorphism can be misused in a user interface.
NA	NA	CTE.UID.2.3	Understand how people store chunks of data in their working memory.
NA	NA	CTE.UID.2.4	Compare and contrast the command language, menu/form, and direct manipulation styles of user interaction.
NA	NA	CTE.UID.2.5	Explain how system models, interface models, and user models are connected.
NA	NA	CTE.UID.2.6	Explain the difference between perceived affordance and actual affordance.
NA	NA	CTE.UID.2.7	Show how natural mapping can be used to increase the learnability of a user interface.
NA	NA	CTE.UID.2.8	Explain how internal, external, and metaphorical consistency can be used to increase the learnability of a user interface.
NA	NA	CTE.UID.2.9	Know the user interface guidelines of the development platform.

Outcome 3:

CTE.UID.3		**Students will show how visibility enhances a user interface.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.3.1	Define actions, state, and feedback in the context of visibility.
NA	NA	CTE.UID.3.2	Show examples of affordances for user actions in a user interface.
NA	NA	CTE.UID.3.3	Explain the principle of self-disclosure.
NA	NA	CTE.UID.3.4	Show how to give an information scent to navigation in a user interface.
NA	NA	CTE.UID.3.5	Show how to make different modes visible to the user.
NA	NA	CTE.UID.3.6	Show how feedback (visual, auditory, and haptic) affects the visibility of a user interface.
NA	NA	CTE.UID.3.7	Some how to use the concept of perceptual fusion to give feedback to the user.

Outcome 4:

CTE.UID.4		**Students will show how to use cognitive processes to enhance the efficiency of a user interface.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.4.1	Utilize skill-based, rule-based, and knowledge-based decision making in a user interface.
NA	NA	CTE.UID.4.2	Explain the implications of Fitts' Law for user interface design.
NA	NA	CTE.UID.4.3	Utilize aggregates to group related commands or questions.

Outcome 5:

CTE.UID.5		**Students will show how to mitigate errors in user interfaces and write good error messages when errors do occur.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.5.1	Explain the differences between lapses and slips.
NA	NA	CTE.UID.5.2	Explain the differences between capture slips and description slips.
NA	NA	CTE.UID.5.3	Show how to avoid lapses.
NA	NA	CTE.UID.5.4	Show how to avoid capture and description slips.

NA	NA	CTE.UID.5.5	Show how to avoid mode errors.
NA	NA	CTE.UID.5.6	Explain how users interact with error messages.
NA	NA	CTE.UID.5.7	Write error messages that are precise, restate the user's input, speak the user's language, and suggest alternative options.
NA	NA	CTE.UID.5.8	Show how to give users control over dialog boxes.
NA	NA	CTE.UID.5.9	Show how to provide at least a single-step undo option.

Outcome 6:

CTE.UID.6		**Students will create a user interface following the user-centered design process.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.6.1	Compare and contrast the iterative design process with the waterfall model.
NA	NA	CTE.UID.6.2	Explain why the waterfall model is poorly suited for user interface design.
NA	NA	CTE.UID.6.3	Explain the spiral model of software development.
NA	NA	CTE.UID.6.4	Explain the steps of the user-centered design process.

Outcome 7:

CTE.UID.7		**Students will use task analysis to plan a user interface.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.7.1	Identify characteristics of targeted users for a user interface.
NA	NA	CTE.UID.7.2	Complete a user analysis using questionnaires, interviews, or observation.
NA	NA	CTE.UID.7.3	Complete a task analysis to identify the major goal of a user interface and break it into subtasks.
NA	NA	CTE.UID.7.4	Complete a domain analysis by drawing a domain diagram.

Outcome 8:

CTE.UID.8		**Students will create a design for a user interface.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.8.1	Sketch multiple design ideas on paper for a single user interface.
NA	NA	CTE.UID.8.2	Create a storyboard for a realistic scenario involving the user interface.
NA	NA	CTE.UID.8.3	Determine if codified design patterns should be used for the chosen user interface.

Outcome 9:

CTE.UID.9		**Students will use design patterns to develop a user interface.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.9.1	Describe a model-view-controller pattern.
NA	NA	CTE.UID.9.2	Describe a model-view-controller pattern where the controller acts as a mediator.
NA	NA	CTE.UID.9.3	Describe a model-view pattern.
NA	NA	CTE.UID.9.4	Draw a view tree for a user interface.

Outcome 10:

CTE.UID.10		**Students will implement user testing of a user interface.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.10.1	Compare and contrast formative evaluations, field studies, and controlled experiments in user interface design.
NA	NA	CTE.UID.10.2	Explain how to conduct an A/B test.
NA	NA	CTE.UID.10.3	Explain the five ways to treat a user with respect during a formative evaluation.

NA	NA	CTE.UID.10.4	Prepare a user for a formative evaluation ahead of time following the five ways to treat a user with respect.
NA	NA	CTE.UID.10.5	Follow the five ways to treat a user with respect after a formative evaluation.
NA	NA	CTE.UID.10.6	Find representative users for a formative evaluation.
NA	NA	CTE.UID.10.7	Assign users some representative tasks in a formative evaluation.
NA	NA	CTE.UID.10.8	Note critical incidents during a formative evaluation.
NA	NA	CTE.UID.10.9	Complete a formative evaluation using constructive interaction.

Outcome 11:

CTE.UID.11		**Students will create prototypes for a user interface.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.11.1	Know the difference between low fidelity and high fidelity prototypes.
NA	NA	CTE.UID.11.2	Determine when to build horizontal and vertical prototypes.
NA	NA	CTE.UID.11.3	Create a paper prototype for a user interface.
NA	NA	CTE.UID.11.4	Conduct a user test using a paper prototype.

NA	NA	CTE.UID.11.5	Use a prototyping tool to create a computer prototype.

Outcome 12:

CTE.UID.12		**Students will use principles of graphic design when creating a user interface.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.12.1	Explain the principle of reduction.
NA	NA	CTE.UID.12.2	Explain the principle of regularity.
NA	NA	CTE.UID.12.3	Explain the principle of combining user interface elements.
NA	NA	CTE.UID.12.4	Explain how to use visual variables to convey difference.
NA	NA	CTE.UID.12.5	Explain the principle of associativity.
NA	NA	CTE.UID.12.6	Use margins to introduce white space into a user interface.
NA	NA	CTE.UID.12.7	Explain Gestalt’s principle of proximity.
NA	NA	CTE.UID.12.8	Show how to best display information to the user of a user interface.

NA	NA	CTE.UID.12.9	Explain why color differences alone should not be used to convey different features of a user interface.
NA	NA	CTE.UID.12.10	Define the dimensions of a font including x-height, m-width, ascender, descender, serif, baseline, ascent, descent, bowl, stem, and aperture.
NA	NA	CTE.UID.12.11	Explain the typography principles of kerning and leading.
NA	NA	CTE.UID.12.12	Explain the role of animation in user interface design.

Outcome 13:

CTE.UID.13		**Students will make user interfaces that are accessible.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**
NA	NA	CTE.UID.13.1	Explain the principle of equitable use.
NA	NA	CTE.UID.13.2	Follow the guidelines of Section 508 and the W3C Accessibility Initiative, if applicable, when creating a user interface.
NA	NA	CTE.UID.13.3	Support keyboard access for all functions of a user interface.

Outcome 14:

CTE.UID.14		**Students will analyze user interfaces using heuristics.**	
Pacing:		**Local Code:**	**Components:**
Instruct	**Assess**		**Students will:**

NA	NA	CTE.UID.14.1	Know the components of Neilsen Heuristics, Norman Principles, Tog's First Principles, and Schneiderman's 8 Golden Rules.
NA	NA	CTE.UID.14.2	Evaluate a user interface using a set of heuristics.
NA	NA	CTE.UID.14.3	Rate issues found during a heuristic analysis on a severity scale.