California Open Online Library for Education & Accessibility

COOL4Ed (the California Open Online Library for Education) was created so that faculty can easily find, adopt, utilize, review and/or modify free and open etextbooks for little or no cost. The COOL4Ed accessibility open textbook evaluations can inform faculty, staff, and students how the free and open etextbooks meet 15 accessibility "checkpoints" that could impact the learning of learners with a range of disabilities.

SUMMARY OF ACCESSIBILITY EVALUATION:

Textbook: **Precalculus (OpenStax)**
Format of Textbook: **HTML**

Assistive Technology (AT) Evaluation Score: Overall	6.3 (Maximum score = 10)
Assistive Technologies (AT) Evaluations applies specialized tools and software in the accessibility evaluation process. These specialized assistive technologies, see list below, are typically not used or available by the general public into the accessibility evaluation process. • Accessibility features of desktop operating systems (e.g. high-contrast display themes, settings from the Keyboard and Mouse control panels) • Accessibility-related software included with desktop operating systems (e.g. VoiceOver, Microsoft Narrator) • Third-party accessibility software and hardware: • Screen readers (e.g. JAWS, Window Eyes) • Magnification software (e.g. ZoomText Magnifier/Reader, MAGIC Pro with Speech) • Reading software for users with learning disabilities (e.g. Read and Write Gold, Kurzweil 3000) • Refreshable Braille displays	
Non- Assistive Technology (NAT) Evaluation Score: Overall	8.5 (Maximum score =10)
Non-Assistive Technologies (NAT) Evaluations applies only native or basic tools and software such as the keyboard and Narrator in the accessibility evaluation process. These non-assistive technologies are readily available and used by the general public.	

COOL4Ed Accessibility Evaluation Methods:

The California State University Accessible Technology Initiative and MERLOT (Multimedia Educational Resources for Learning and Online Teaching) developed the rubric or "checkpoints" for the accessibility evaluation. CAST, a nationally recognized organization with expertise in accessibility and UDL, reviewed and affirmed the appropriateness and value of the accessibility evaluation rubric and contributed the references and support resources to help people learn how best to design, evaluate, and remediate the learning materials to maximize the accessibility of the learning resources for all. The "checkpoints" have been built upon the Section 508 technical standards and has been organized and tailored to the typical characteristics of digital resources used in higher education courses.

The accessibility evaluations were performed by the Center for Usability in Design and Accessibility at California State University, Long Beach; faculty and graduate students with expertise in human factors, usability, and accessibility performed the evaluations of over 150 free and open etextbooks. COOL4ed.org has published the accessibility evaluation rubric and provides a detailed description of the methodology used to evaluate the accessibility of the etextbooks in COOL4ed.

LOOKING FOR DETAILED ACCESSIBILITY REPORTS?

See Detailed Accessibility Evaluation Report using Assistive Technologies

See Detailed Accessibility Evaluation Report using Non-Assistive Technologies

DETAILED ACCESSIBILITY EVALUATION REPORT using
Assistive Technologies

Assistive Technologies (AT) Evaluations applies specialized tools and software in the accessibility evaluation process.   These specialized assistive technologies, such as Kurzweil and NVDA, are typically not used or available by the general public into the accessibility evaluation process.

1. Accessibility Documentation

A. The organization providing the online materials has a formal accessibility policy.	**Fail**
Additional Information:	**Did not find any information about Open Stax College's Formal Accessibility Policy.**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**Did not find any information about Open Stax College's Accessibility Statement.**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**Did not find any information about Open Stax College's Accessibility Evaluation Report.**

2. Text Access

A. The text of the digital resource is available to assistive technology that allows the user to enable text-to-speech (TTS) functionality.	**Fail**
Additional Information:	**0/2 Chapters passed. Not all contents within the book were successfully translated to audio. While normal text was read properly, NVDA would stop as soon as it reached a math equation, skipping important information. Furthermore, you could not navigate through the textbook using NVDA hotkeys. However, graphs, figures, and tables were translated with a sufficient amount of detail and in a logical way that the reader would be able to understand the content within the book (Chapters and subchapters checked 3 and 8).**

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**
Additional Information:	**2/2 Chapters passed. Regular text and images were easily zoomed in (to 200%) and out (to 33%) with out any disruptive altercation to either text or images(Chapters and subchapters checked, 1 and 6).**
B. The resource allows the user to adjust the font size and font/background color (or is rendered by an application such as a browser, media player, or reader) that offers this functionality.	**Pass**
Additional Information:	**2/2 Chapters passed Using Care for Your Eyes on Google Chrome, font and background did change color when nightmode was selected (Chapters and subchapters checked 1 and 6).**

4. Reading Layout

A. Text of the digital resource is compatible with assistive technology that allows the user to reflow the text by specifying the margins and line spacing (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Pass**
Additional Information:	**30/30 pages passed for reflow of text, regular text and images were easily zoomed in (to 200%) and out (to 33%) with out any disruptive altercation to either text or images (Chapters and subchapters checked, 3 and 5).**
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	**Fail**
Additional Information:	**HTML version of textbook goes by chapter and subchapter titles while PDF version of textbook goes by page numbers, you will not be able to find a specific page number in the HTML version (Chapters checked 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12).**

5. Reading Order

A. The reading order for digital resource content logically corresponds to the visual layout of the page when rendered by assistive technology.	**Fail**
Additional Information:	**0/2 Chapters passed. Not all contents within the book were successfully translated to audio. While normal text was read properly, NVDA would stop as soon as it reached a math equation, skipping important information. Furthermore, you could not navigate through the textbook using NVDA hotkeys. However, graphs, figures, and tables were translated with a sufficient amount of detail and in a logical way that the reader would be able to understand the content within the book (Chapters and subchapters checked 3 and 8).**

6. Structural Markup/Navigation

A. The text of the digital resource includes markup (e.g. tags or styles) that allows for navigation by key structural elements (chapters, headings, pages) using assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Fail**
Additional Information:	**0/2 chapters passed. You were not able to navigate through the text, headers, lists, links, and tables, by using the NVDA hotkeys. Chapters and subchapters checked (7 and 12).**
B. The text of the digital resource includes markup for bullets and numbered lists that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Fail**
Additional Information:	**0/10 lists passed. You were not able to navigate through the lists by using the NVDA hotkeys; furthermore, NVDA would not read the lists in a**

	consistent pattern and would stop or skip information. Chapters checked 3.1 (0/8 lists) 3.7 (0/2 lists).
C. If the text of the digital resource is delivered within an ebook reader application, a method is provided that allows users to bypass the reader interface and move directly to the text content that is compatible with assistive technology.	N/A
Additional Information:	Not using eReader application in this evaluation.

7. Tables

A. Data tables include markup (e.g. tags or styles) that identifies row and column headers in a manner that is compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	Fail
Additional Information:	0/14 tables passed. Tables did not consists of any description of what was inside the tables than the content within the table. The tables were not translated properly by NVDA, or read cell by cell, and you were not able to navigate in all directions using directional keys. Tables were not translated in a logical manner and the reader would not be able to understand the content that was located within the table. Subchapter checked 1.1 (0/14 tables passed).

8. Hyperlinks

A. In-book links take you to a location within the textbook. For example, the table of contents would be considered in-book links and embedded links take you to the correct location in the book.	N/A
Additional Information:	Hyperlinks (within book).

B. Live hyperlinks take you to any website or webpages external to the book.	**Pass**
Additional Information:	**20/20 live hyperlinks functioned properly and took the reader to the expected websites on the internet and/or to figures, examples, and solutions within the textbook. Subchapters checked 7.2 (10/10 links worked), 10.1 (10/10 links worked).20/20 live hyperlinks worked and had a proper descriptions of the hyperlinks. The other hyperlinks within the book were labeled with a URL. Subchapters checked 7.2 (10/10 links worked), 10.1 (10/10 links worked).**
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	**20/20 live hyperlinks functioned properly and took the reader to the expected websites on the internet and/or to figures, examples, and solutions within the textbook. Subchapters checked 7.2 (10/10 links worked), 10.1 (10/10 links worked).**
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**20/20 live hyperlinks worked and had a proper descriptions of the hyperlinks. The other hyperlinks within the book were labeled with a URL. Subchapters checked 7.2 (10/10 links worked), 10.1 (10/10 links worked).**

9. Color and Contrast

A. All information within the material that is conveyed using color is also available in a manner that is compatible with those that do not perceive color, and information conveyed by color is also conveyed in other ways.	**Pass**
Additional Information:	**2/2 chapters passed and had consistent color redundency. Main Headers were black against a white background and passed AA standards. Subheaders were larger and black against a white background. Text was consistently black against a**

	white background. Hyperlinks within text were blue and and bolded. All text, headings, and simple images pass the AA standard (Chapters and subchapters checked 9 and 11).
B. Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:	**2/2 chapters passed and had consistent color redundency. Main Headers were black against a white background and passed AA standards. Subheaders were larger and black against a white background. Text was consistently black against a white background. Hyperlinks within text were blue and and bolded. All text, headings, and simple images pass the AA standard (Chapters and subchapters checked 9 and 11).**
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Pass**
Additional Information:	**Section heading passed (Chapters and subchapters checked 9 and 11).**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**All text passed (Chapters and subchapters checked 9 and 11).**
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Simple images within the text passed AA standards, (9 and 11).**

10. Language

A. The text of the digital resource includes markup that declares the language of the content in a manner that is compatible with assistive technology.	**Pass**

Additional Information:	**"lang="en-us" code found, language markup is in english.**
B. If the digital resource includes passages in a foreign language, these passages include markup that declares the language in a manner that is compatible with assistive technology.	**N/A**
Additional Information:	**No passages found in foreign languages.**

11.Images

A. Non-decorative images have alternative text that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Pass**
Additional Information:	**2/2 chapters had non-decorative images that were read properly by NVDA. When NVDA encountered these images they simply read out the decription found within img "" code. When searching for image alt"' in the code, alternative names and descriptions were not given. Chapters and subchapters checked 4.2 (3/3 non-decorative images have good descriptions within image alt "') , 8.2, (26/26 non-decorative images have good descriptions within image alt""). All images were read by NVDA with a proficient amount of information, the reader would understand the logic and content within the image.**
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	**N/A**
Additional Information:	**No decorative images found. Chapters and subchapters checked 4.2 (no decorative images), 8.2 (no decorative images).**
C. Complex images, charts, and graphs have longer text descriptions that are compatible with assistive technology (or are rendered by an application such as a browser, media	**Pass**

player, or reader) that offers this functionality).	
Additional Information:	**2/2 chapters had complex images that were read properly by NVDA. When NVDA encountered these images they simply read out the decription found within img "" code. Furthermore, there were no captions that conveyed a logical and proper description of each image. Chapters checked 4.2 (3/3 complex images have a caption that conveys a logical and proper decription of the presented image), 8.2 (26/26 complex images have a caption that conveys a logical and proper decription of the presented image).**

12.Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	**N/A**
Additional Information:	**No multimedia content found.**
B. A transcript is provided with all audio content.	**N/A**
Additional Information:	**No multimedia content found.**
C. Audio/video content is delivered via a media player that is compatible with assistive technology. This includes support for all criteria listed in Section 15 below.	**N/A**
Additional Information:	**No multimedia content found.**

13.Flickering

A. The digital resource content does not contain anything that flashes more than three times in any one-second period.	**Pass**
Additional Information:	**No flickering content.**

14. *Science, Technology, Engineering, and Math (STEM)*

A. STEM figures have appropriate markup that indicates that the image is a figure.	**Pass**
Additional Information:	**26/26 figures pass. Figures were properly marked as figures and when NVDA encountered these images they were read out with sufficient amount of information. Furthmore, the captions conveyed a logical and proper description of each image. Chapters checked 8.2 (26/26 figures).**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**Fail**
Additional Information:	**Graphs were not properly marked as graphs, they were marked as figures. However, NVDA read out the graphs in a clear and logical manner. (Subchapters checked 7.4, 0/4 graphs passed, 8.7, 6/6 graphs passed).**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**Fail**
Additional Information:	**Equations were not properly marked as equations. Subchapter checked 10.2 (0/83 equations).**
D. STEM tables have appropriate markup that indicates the image is a table.	**Fail**
Additional Information:	**0/14 tables passed, they were not properly marked as tables. Subchapter checked 1.1 (0/14 tables passed).**
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	**26/26 figures pass. Figures were properly marked as figures and when NVDA encountered these images they were read out with sufficient amount of information. Furthmore, the captions conveyed a logical and proper description of each image. Chapters checked 8.2 (26/26 figures).**

F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	**10/10 graphs passed and were read properly and in a logical manner by NVDA. Subchapters checked 7.4, 4/4 graphs passed, 8.7 (6/6 graphs passed).**
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	**Equations were not properly marked as equations and NVDA disregarded them altogether. NVDA would not read any equations throughout the text. Subchapter checked 10.2 (0/83 equations).**
H. Assistive technology used can access the content from the STEM tables.	**Fail**
Additional Information:	**0/14 tables passed. Tables did not consists of any description of what was inside the tables than the content within the table. The tables were not translated properly by NVDA, or read cell by cell, and you were not able to navigate in all directions using directional keys. Tables were not translated in a logical manner and the reader would not be able to understand the content that was located within the table. Subchapter checked 1.1 (0/14 tables passed).**

15. Interactive Elements

A. Each interactive element (e.g. menu, hyperlink, button) and function (e.g. annotations) allows keyboard-only operation both with and without assistive technology.	
Additional Information:	**Successfully navigated through 2 chapters (2 and 7) by using the TAB and ENTER keys on the keyboard.**
B. Each interactive element conveys information to assistive technology regarding the	

element's name, type, and status (e.g. "Play, button, selected").	
Additional Information:	**No markup interactive elements found.**
C. All instructions, prompts, and error messages necessary to complete forms are conveyed as text to assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	
Additional Information:	**No text interactive elements found.**

DETAILED ACCESSIBILITY EVALUATION REPORT using
Non-Assistive Technologies

Non-Assistive Technologies (NAT) Evaluations applies only native or basic tools and software such as the keyboard and Narrator in the accessibility evaluation process. These non-assistive technologies are readily available and used by the general public.

1. Accessibility Documentation

A. The organization providing the online materials has a formal accessibility policy.	**Fail**
Additional Information:	**Not found**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**Not found**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**Not found**

2. Text Access

A. The text of the digital resource is available to assistive technology that allows the user to enable text-to-speech (TTS) functionality.	**Pass**
Additional Information:	**2/2 chapters work with text to speech function on Google Chrome. Chapter 1 & 10 were checked.**

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**
Additional Information:	**2/2 chapters work. Chapters 1 & 10 were checked.**
B. The resource allows the user to adjust the font size and font/background color (or is rendered by an application such as a browser, media player, or reader) that offers this functionality).	**Pass**
Additional Information:	**2/2 chapters pass. 1 &10 were checked. In both chapters the text works with Care your Eyes in chrome by the images do not work. Also for it to be effective, you must click the refresh button. For other html books, Care you eyes works as soon as you turn it on.**

4. Reading Layout

A. Text of the digital resource is compatible with assistive technology that allows the user to reflow the text by specifying the margins and line spacing (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Pass**
Additional Information:	**30/30 links work. 1 & 10 were checked.**
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	**Pass**
Additional Information:	**30/30 chapeter/links match the PDF version. Chapters 1 & 10 were checked.**

5. Reading Order

A. The reading order for digital resource content logically corresponds to the visual layout of the page when rendered by assistive technology.	**N/A**
Additional Information:	**Non-assistive technology only.**

6. Structural Markup/Navigation

A. The text of the digital resource includes markup (e.g. tags or styles) that allows for navigation by key structural elements (chapters, headings, pages) using assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	**Non-assistive technology only.**
B. The text of the digital resource includes markup for bullets and numbered lists that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	**Non-assistive technology only.**
C. If the text of the digital resource is delivered within an ebook reader application, a method is provided that allows users to bypass the reader interface and move directly to the text content that is compatible with assistive technology.	**N/A**
Additional Information:	**Non-assistive technology only.**

7. Tables

A. Data tables include markup (e.g. tags or styles) that identifies row and column headers in a manner that is compatible with assistive	**N/A**

technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	
Additional Information:	**Non-assistive technology only.**

8. Hyperlinks

A. In-book links take you to a location within the textbook. For example, the table of contents would be considered in-book links and embedded links take you to the correct location in the book.	**N/A**
Additional Information:	**HTML documents only cotain live links, inbook links are available.**
B. Live hyperlinks take you to any website or webpages external to the book.	**Pass**
Additional Information:	**Average Score**
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	**Non-assistive technology only.**
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**20/20 links checked pass.**

9. Color and Contrast

A. All information within the material that is conveyed using color is also available in a manner that is compatible with those that do not perceive color, and information conveyed by color is also conveyed in other ways.	**Fail**
Additional Information:	**All the links found in the table of content are blue to indicate they are hyperlinks however they do not have another method other than color to indicate they are a link. This problem is also found in the links**

		"show solution" throughout the text. Chapters 1 & 10 were checked.
B.	Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:		**Average Score**
C.	Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Pass**
Additional Information:		**14/14 Header check in chapters 1 & 10 pass.**
D.	Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:		**All body in the chapters 1 & 10 pass.**
E.	Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**N/A**
Additional Information:		**No simple images found in chapter 1 & 10.**

10. Language

A.	The text of the digital resource includes markup that declares the language of the content in a manner that is compatible with assistive technology.	**Pass**
Additional Information:		**2/2 Chapters pass. 1 & 10 were checked.**
B.	If the digital resource includes passages in a foreign language, these passages include markup that declares the language in a manner that is compatible with assistive technology.	**N/A**
Additional Information:		**No other language found.**

11. Images

A.	Non-decorative images have alternative text that is compatible with assistive technology (or is rendered by an application such as a	**Fail**

browser, media player, or reader that offers this functionality).	
Additional Information:	**8/15 images pass. For the most part these images are found at the top of the chapter or section. Images found at the top of 1.5, 10.1, 10.2, 10.3, 10.4, and 10.5 fail. They have an alt tag but they alt tag is blank. Chapter 1 & 10 were checked.**
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	**Pass**
Additional Information:	**1/1 images pass.**
C. Complex images, charts, and graphs have longer text descriptions that are compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader) that offers this functionality).	**Pass**
Additional Information:	**Over 50 images pass of graphs pass. All the graphs have alt tags. Chapters 1 & 10 pass.**

12. Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	**N/A**
Additional Information:	**No multimedia found.**
B. A transcript is provided with all audio content.	**N/A**
Additional Information:	**No multimedia found.**
C. Audio/video content is delivered via a media player that is compatible with assistive technology. This includes support for all criteria listed in Section 15 below.	**N/A**
Additional Information:	**No multimedia found.**

13. Flickering

A. The digital resource content does not contain anything that flashes more than three times in any one-second period.	**Pass**
Additional Information:	**No flickering. Chapter 1-10 were checked.**

14. Science, Technology, Engineering, and Math (STEM)

A. STEM figures have appropriate markup that indicates that the image is a figure.	**N/A**
Additional Information:	**No stem figure found.**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**Pass**
Additional Information:	**Over 10 graphs were found in chapter 1 & 10 and all have appropriate mark ups.**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**Fail**
Additional Information:	**0/10 equations are marked up. These equations are found in chapter 3.**
D. STEM tables have appropriate markup that indicates the image is a table.	**Fail**
Additional Information:	**0/10 tables are marked up in chapter 3.**
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**N/A**
Additional Information:	**No stem figure found.**
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	**Over 10 graphs were found in chapter 1 & 10 and all had appropriate markup.**
G. STEM equations have appropriate notation markup that conveys both the notation	**Pass**

(presentation) and meaning (semantics) of the STEM content.	
Additional Information:	**10/10 have proper description when necessary. For example when the equation was the problem there was no description of the equation since the equation was the problem.**
H. Assistive technology used can access the content from the STEM tables.	**Fail**
Additional Information:	**4/10 tables are have proper description in chapter 3.**

15.Interactive Elements

A. Each interactive element (e.g. menu, hyperlink, button) and function (e.g. annotations) allows keyboard-only operation both with and without assistive technology.	**Pass**
Additional Information:	**Chapter 1 and 10 were checked and the tab key & enter key work properly. The interactive elements are only found in the navigation panel.**
B. Each interactive element conveys information to assistive technology regarding the element's name, type, and status (e.g. "Play, button, selected").	**N/A**
Additional Information:	**Non-assistive technology only.**
C. All instructions, prompts, and error messages necessary to complete forms are conveyed as text to assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	**Non-assistive technology only.**

© 2016 California State University (Version 1.0)