



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: Apex Calculus 3.0
Format of Textbook: PDF

Assistive Technology (AT) Evaluation Score: Overall	6.8 (Maximum score = 10)
<p>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.</p> <ul style="list-style-type: none"> • 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	5.8 (Maximum score =10)
<p>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.</p>	



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:	No accessibility documentation was found.
B. The organization providing the online materials has an accessibility statement.	Fail
Additional Information:	No accessibility documentation was found.
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	No accessibility documentation was 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:	5/5 pages passed.

3. Text Adjustment

A. Text is compatible with assistive technology.	Fail
Additional Information:	0/5 pages passed.
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:	5/5 pages passed.



4. Reading Layout

<p>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).</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>5/5 pages passed.</p>
<p>B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No printed version.</p>

5. Reading Order

<p>A. The reading order for digital resource content logically corresponds to the visual layout of the page when rendered by assistive technology.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>5/5 pages passed.</p>

6. Structural Markup/Navigation

<p>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).</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/44 pages pass.</p>
<p>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,</p>	<p>Fail</p>



media player, or reader that offers this functionality).	
Additional Information:	0/10 lists pass.
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 reader application.

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:	0/10 tables pass.

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.	Pass
Additional Information:	30/30 links pass.
B. Live hyperlinks take you to any website or webpages external to the book.	Fail
Additional Information:	1/2 subsections passed.
C. Live links take you to the correct webpage that is functioning properly.	Pass
Additional Information:	6/7 links found and pass.



D. Live links are descriptive enough for the users to know where it should take them.	Fail
Additional Information:	0/7 links found and 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:	0/44 pages pass.
B. Information is conveyed from the sub-categories for contrast.	Pass
Additional Information:	44/44 pages pass.
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	Pass
Additional Information:	44/44 pages pass.
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	Pass
Additional Information:	44/44 pages 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.

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.	Fail
Additional Information:	Primary language failed.
B. If the digital resource includes passages in a foreign language, these passages include	N/A



markup that declares the language in a manner that is compatible with assistive technology.	
Additional Information:	No foreign language was found in this book.

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).	N/A
Additional Information:	All images complex.
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:	All images complex.
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:	33/33 images found 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 was found.
B. A transcript is provided with all audio content.	N/A
Additional Information:	No multimedia was 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 was 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 was found.

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	Pass
Additional Information:	10/10 pass.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	N/A
Additional Information:	Graphs considered figures.
C. STEM equations have appropriate markup that indicates that the image is an equation.	Fail
Additional Information:	0/10 pass.
D. STEM tables have appropriate markup that indicates the image is a table.	Fail
Additional Information:	0/10 pass.
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Pass
Additional Information:	10/10 pass.
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	N/A
Additional Information:	Graphs considered figures.
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 pass.
H. Assistive technology used can access the content from the STEM tables.	Pass
Additional Information:	10/10 pass.

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.	N/A
Additional Information:	No interactive elements were found.
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:	No interactive elements were 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).	N/A
Additional Information:	No interactive elements were 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:	No Content Found
B. The organization providing the online materials has an accessibility statement.	Fail
Additional Information:	No Content Found
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	No Content 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.	Fail
Additional Information:	Pgs 11-16 were checked. The text is available to assistive technology that allows user to enable text-to-speech functionality. The text was read word for word. In other words, the text to speech function read the words and it read it without rhythm. It sounded like it was just reading words instead of sentences made up of words.

3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
--	-------------



Additional Information:	Pgs 11-16 were checked. When the window page chaged in size, no horizontal bar appeared. The font size of all pages checked could be adjusted.
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:	Pgs 11-16 were checked. When changing the font/background color to green text on black, the background color did change to black and the font color did change to green.

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).	Fail
Additional Information:	Pgs 11-16 were checked. When reflowing the text, the text to speech function did not work. The text was available for assistive technology. The text was able to reflow but there was no space between words. The text-to-speech funciton read them as one word and made no sense.
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	N/A
Additional Information:	Need additional information. We do not have printed material to compare it too.

5. Reading Order

A. The reading order for digital resource content logically corresponds to the visual layout of	Pass
---	-------------



the page when rendered by assistive technology.	
Additional Information:	Pgs 11-16 were checked. The reading order was logical on all five pages.

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:	The tagged PDF, Headings, and Title all failed using the accessibility checker. Bookmarks passed.
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:	There were no list structural markups. The Tagged PDF, Headings, and Title all failed using the accessibility checker. Bookmarks passed.
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.	Fail
Additional Information:	There was none found. The Tagged PDF, Headings, and Title all failed using the accessibility checker. Bookmarks passed.



7. Tables

<p>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).</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/5 tables included alternative text that identified as rows and columns headers. The tables were on pages 2, 3 (2 images), and 4 (2 images). The text-to-speech function did not read the tables. The text was not available for text-to-speech function. Using the accessibility checker, the rows TH and TD, headers and regularity all failed.</p>

8. Hyperlinks

<p>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.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>20/20 within hyperlinks worked. All within links were found on page 3 and 4. Only 20 within links were found throughout the book. All within links were found in the beginning of the book. All links worked and were descriptive enough to convey meaning. Using the Accessibility checker, navigation links passed.</p>
<p>B. Live hyperlinks take you to any website or webpages external to the book.</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>5/5 live links worked. The link were found on pages 7 (2 links), 9 (2 links), and 72. All links worked and were in URL form. The text-to-speech function read the link in URL form. Using the accessibility checker, the navigation links passed.</p>
<p>C. Live links take you to the correct webpage that is functioning properly.</p>	<p>Pass</p>



Additional Information:	5/5 live links worked. The link were found on pages 7 (2 links), 9 (2 links), and 72. The accessibility checker showed nagivation links passed.
D. Live links are descriptive enough for the users to know where it should take them.	Fail
Additional Information:	0/5 live links were descriptive enough. The link were found on pages 7 (2 links), 9 (2 links), and 72. All links were in URL (www.) form. The text-to-speech function read the links in URL form. Using the accessibility checker, navigation links passed.

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:	Pgs 11-55 were checked. Information not conveyed by color alone. Size of font was used to convey information as well as the style (bold vs non-bold text, Italics vs print). The chapter titles larger is size compared to the rest of the text. Definitions were in yellow background and black text.
B. Information is conveyed from the sub-categories for contrast.	Pass
Additional Information:	Pgs 11-55 were checked. Most pages had the contrast ratio of 4.51:1 and above (11.98:1). The chapter titles were larger in size compared to the rest of the text. The chapter titles passed with 21.0:1. There was text in italics which passed with a ratio of 20.04:1. Small headers at the top of the page passed with a ratio of 14.42:1. Subheadings within a chapter passed with a ratio of 20.05:1. Definitions were presented on a yellow background. The text for definitions passed with a ratio of 19.82:1. Theorem properties were on a green background and passed with a ratio of 20.19:1.



C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	Pass
Additional Information:	Pgs 11-55 were checked. Large chapter headings passed with a ratio of 21.0:1. Small headers at the top of the page failed with a ratio of 14.42:1.
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	Pass
Additional Information:	Pgs 11-55 were checked. The text on pages checked had the contrast ratio of 4.51:1 and above (11.98:1). The chapter titles were larger in size compared to the rest of the text. The chapter titles passed with 21.0:1. There was text in italics which passed with a ratio of 20.04:1. Small headers at the top of the page passed with a ratio of 14.42:1. Subheadings within a chapter passed with a ratio of 20.05:1. Definitions were presented on a yellow background. The text for definitions passed with a ratio of 19.82:1. Theorem properties were on a green background and passed with a ratio of 20.19:1.
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	Fail
Additional Information:	Pgs 11-16 were checked. Simple images failed with a ratio of 4.51:1 and below (Example: On page 12, the simple image failed with a ratio of 3.51:1).

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.	Fail
Additional Information:	Using the accessibility checker the primary language failed.
B. If the digital resource includes passages in a foreign language, these passages include markup that declares the language in a	Fail



manner that is compatible with assistive technology.	
Additional Information:	Using the accessibility checker the primary language failed.

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).	Fail
Additional Information:	0/10 non-decorative images included alternative text. Images were found on pages 2 (3 images), 3 (3 images), 4 (3 images), and 5. Figures alternative text failed.
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. Figures alternative text failed.
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).	Fail
Additional Information:	0/10 complex images had descriptive alternative text. Images were found on pages 5 (4 images), 6, 7 (2 images), 10, 43, and 58. All complex images had alternative text that conveyed meaning on the images. Figures alternative text failed.

12.Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	N/A
---	------------



Additional Information:	No content found.
B. A transcript is provided with all audio content.	N/A
Additional Information:	No 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 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:	Pgs 1-10 were checked. No flickering content was observed. Using the accessibility checker, screen flicker passed.

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	Pass
Additional Information:	10/10 figures markups are compatible with assistive technology and were sufficient to convey meaning. Figures were found on pages 2 (3 images), 3 (3 images), 4 (3 images), and 5.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	N/A
Additional Information:	Graphs were under figure markups.
C. STEM equations have appropriate markup that indicates that the image is an equation.	N/A
Additional Information:	No equations were found throughout the book.
D. STEM tables have appropriate markup that indicates the image is a table.	N/A
Additional Information:	Tables were under figure markups.



E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Fail
Additional Information:	0/10 figures notation markups are compatible with assistive technology and were sufficient to convey meaning and presentation. The notation markups were not sufficient enough. Figures were found on pages 2 (3 images), 3 (3 images), 4 (3 images), and 5.
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	N/A
Additional Information:	Graphs were under figure notation markups.
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	N/A
Additional Information:	No equations were found throughout the book.
H. Assistive technology used can access the content from the STEM tables.	N/A
Additional Information:	Tables were under figure notation markups.

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.	N/A
Additional Information:	No Interactive Element Present.
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:	No Interactive Element Present.



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:	No Interactive Element Present.

© 2016 California State University (Version 1.0)



This work licensed under a Creative Commons Attribution 4.0 International License:
<https://creativecommons.org/licenses/by/4.0/>. Please attribute the California State University when using this work.