



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: First Course in Linear Algebra

Format of Textbook: HTML

Assistive Technology (AT) Evaluation Score: Overall	5.6 (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	8.3 (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:	Did not find formal accessibility policy URL.
B. The organization providing the online materials has an accessibility statement.	Fail
Additional Information:	Did not find formal accessibility Statement URL.
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	Did not find formal 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. NVDA did read the content fully or continuously. When tabbing, nvda will always read the content bar first and then the content. All math equations, math symbols, some headings and some links were skipped by nvda. Chapters 1 and 2 were checked.

3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
Additional Information:	2/2 chapter passed. Regular text and images were easily zoomed in and out at 250% without any disruptions. The content is pushed over a little to the



	right side of the webpage but is not disruptive. Chapters 1 and 2 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 passed. In all 2 chapters the font and background color changed using "care your eyes." Chapters 8 and 9 were checked.

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:	31/31 webpages reflowed when increasing the page size by zooming in and out to 250%. Home page and chapter 1-4 were checked.
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	N/A
Additional Information:	0/30 web pages passed. There were no page numbers included in the html version to compare to the pdf version.

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:	0/5 pages passed. Content was not fully read using nvda. Reading order for digital resource content did not logically correspond to the reading layout of the



	page when rendered by nvda. For each page, NVDA skipped equations (identified them as "math"). Chapter 1, 1.2. 1.3, 1.4, and 1.5 were checked.
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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. Was unable to navigate through the text using nvda quick keys. When jumping from heading to heading, nvda would read the headings in the content bar first. NVDA would skip some headings, equations and list. Chapters 2 and 3 were checked.
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).	Pass
Additional Information:	12/15 list passed. Chapter 5.1 (12/15) was checked. For every chapter nvda will read the content bar as a list, which comprises of a total of 12 list. For the list that were in the chapter alone, nvda was able to identify the list but failed to read it properly. This chapter passed solely as a result of the content bar being read correctly as a list.
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 e-reader application.
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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:	1/1 tables passed. Table was marked up as a table and there were descriptions to convey its meanings. Nvda was able to identify and read the table. Chapter 4.5 (1/1) was checked. There was only one table found in the book.

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:	
B. Live hyperlinks take you to any website or webpages external to the book.	Pass
Additional Information:	Average score between hyperlink functionality and description.
C. Live links take you to the correct webpage that is functioning properly.	Pass
Additional Information:	88/88 links functioned properly. All links in the content bar led you to the right webpage. All links in the content bar were checked.
D. Live links are descriptive enough for the users to know where it should take them.	Pass
Additional Information:	59/82 links passed. There was 1 link that was a url in the intro. Most links had a descriptions, although



	<p>inside the descriptions there were acronyms. Links that were only shown as acronyms failed. There were some links that had acronyms but when you moused over them it provided a pop out descriptions defining the acronyms. Intro (2/3), chapter. 1.2 (27/34) and chapter 1.3 (30/45) were checked.</p>
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9. Color and Contrast

<p>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.</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/2 chapters passed. All links in the content bar were displayed by one color (green) only. They were not underlined, blue or bolded. This occurs for chapters 1-9.</p>
<p>B. Information is conveyed from the sub-categories for contrast.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>Average score</p>
<p>C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>2/2 chapters passed. Chapters 2 and 3 were checked. Header passed AA and AAA requirements.</p>
<p>D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>2/2 chapters passed. Chapters 2 and 3 were checked. Text passed AA and AAA requirements.</p>
<p>E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No simple images.</p>



10. Language

<p>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.</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>Did not find lang=en in the code.</p>
<p>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.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No foreign languages found.</p>

11. Images

<p>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).</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No non-decorative images found. Although, there is an image of a red book in the left hand corner of every webpage. NVDA does not read this.</p>
<p>B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No decorative images found.</p>
<p>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).</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No complex images found.</p>



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 found ch.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.	Fail
Additional Information:	0/10 figures passed. Figures were not marked as figures and instead were marked as diagrams. Chapter 7.1 (0/3), ch.7.2 (0/3), ch.7.3 (0/2) and ch 7.4 (0/2) were checked.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	N/A
Additional Information:	No graphs were found in book. Home and chapters 1-10 were checked.
C. STEM equations have appropriate markup that indicates that the image is an equation.	Fail



Additional Information:	5/11 equations passed. About half of the equations were marked as equations. Chapter 1.1 (5/11) was checked.
D. STEM tables have appropriate markup that indicates the image is a table.	Pass
Additional Information:	1/1 tables passed. Table was marked up as a table and there were descriptions to convey the tables meaning. Nvda was able to identify and read the table using the arrow keys. Chapter 3.5 (1/1) was checked. There was only one table found in the book.
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Pass
Additional Information:	0/10 figures passed. Figures were not marked as figures and instead were marked as diagrams. Although, the book did provide short descriptions on the diagrams, it failed to provide enough information to convey what the figure was. Chapter 7.1 (0/3), ch.7.2 (0/3), ch.7.3 (0/2) and ch.7.4 (0/2) were checked. Diagrams/figures had equations that were not read by NVDA. There was also no way to navigate to the diagrams using nvda.
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	N/A
Additional Information:	No graphs found in book home and chapters 1-10 were checked.
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	N/A
Additional Information:	0/19 equations passed. Checked ch. 1.3 (0/19). NVDA would either skip the equation or read it as "math."



H. Assistive technology used can access the content from the STEM tables.	Pass
Additional Information:	1/1 tables passed. Table was marked up as a table and there was a description to convey it's meaning. Nvda was able to identify and read the table using the quick keys. Chapter 3.5 (1/1) was checked. There was only one table found in the book.

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 keyboard elements 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 markup 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).	N/A
Additional Information:	No interactive text prompts 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:	8/8 chapters work with text to speech.

3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
Additional Information:	8/8 chapters work on google chrome.
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:	8/8 chapters work with care your eyes on google chrome.
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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:	6/8 pages checked reflow. Chapters reflow to a certain extent. Chapters will reflow if you zoom to 200% but will not reflow if you zoom into 200% and make web browser smaller. Chapters will reflow if at 100% zoom and make web browser smaller. However if the chapter has an image the image does not reflow. The image will get cut.
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	N/A
Additional Information:	No printed of pdf version found.

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 AT Tech 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	N/A
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such as a browser, media player, or reader that offers this functionality).	
Additional Information:	Non AT Tech 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 AT Tech 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 AT Tech 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 technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	N/A
Additional Information:	Non AT Tech 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:	No within book links in HTML.



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:	20/20 links work. Links are found on table of contents and throughout the books.
D. Live links are descriptive enough for the users to know where it should take them.	Pass
Additional Information:	20/20 links work. Links are found on table of contents and throughout the books.

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:	Links are color coded to inform user they are links. Links are underlined as well as a redundant code.
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).	Fail
Additional Information:	Headers are mostly black and blue with a white background but the table of cotents is a light green background and with a light green text.
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	Pass
Additional Information:	Text is black and background is white.
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	Pass



Additional Information:	Images are black and white.
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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:	Chapters do not have a language mark up.
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 browser, media player, or reader that offers this functionality).	Pass
Additional Information:	8/10 chapters pass. Images pass using w3c.
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	Pass
Additional Information:	8/10 chapters pass. Images pass using w3c.
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:	Very few complex images found throughout the book but the ones found have a proper alt tag.



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:	8/8 chapters pass.

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	Fail
Additional Information:	3/10 stem figures have a proper mark up.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	N/A
Additional Information:	No stem graphs found.
C. STEM equations have appropriate markup that indicates that the image is an equation.	Fail
Additional Information:	5/10 equations have a proper mark up.
D. STEM tables have appropriate markup that indicates the image is a table.	N/A



Additional Information:	No stem tables found.
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 have a notation.
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	N/A
Additional Information:	No stem graphs found.
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Fail
Additional Information:	1/10 figures have notation.
H. Assistive technology used can access the content from the STEM tables.	N/A
Additional Information:	No stem tables found.

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:	Non-Assistive Technologies only.
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 Technologies only.
C. All instructions, prompts, and error messages necessary to complete forms are conveyed as text to assistive technology (or are rendered	NA



by an application such as a browser, media player, or reader that offers this functionality).	
Additional Information:	Non-Assistive Technologies only.

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