



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: Linear Algebra
Format of Textbook: PDF

Assistive Technology (AT) Evaluation Score: Overall	8.1 (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	6.0 (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 pass.

3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
Additional Information:	5/5 pages pass.
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:	4/5 pages pass.



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 pass.</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 pass.</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>0/25 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>Pass</p>



media player, or reader that offers this functionality).	
Additional Information:	10/10 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).	N/A
Additional Information:	No tables were found.

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 pass.
C. Live links take you to the correct webpage that is functioning properly.	Pass
Additional Information:	19/20 links pass.



D. Live links are descriptive enough for the users to know where it should take them.	Fail
Additional Information:	0/3 links 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:	0/25 pages pass.
B. Information is conveyed from the sub-categories for contrast.	Pass
Additional Information:	2/2 subsections passed.
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	Pass
Additional Information:	25/25 pages pass.
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	Pass
Additional Information:	25/25 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 were 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 used in the text.

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:	50/50 pages pass.
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 were found.
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).	N/A
Additional Information:	No images considered complex.

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.	Fail
Additional Information:	Figures are not marked as figures.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	Fail
Additional Information:	Graphs are not marked as graphs.
C. STEM equations have appropriate markup that indicates that the image is an equation.	Fail
Additional Information:	Equations not marked as equations.
D. STEM tables have appropriate markup that indicates the image is a table.	N/A
Additional Information:	No tables were found.
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 figures pass.
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 pass.
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 equations pass.
H. Assistive technology used can access the content from the STEM tables.	N/A
Additional Information:	No tables were 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:	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 Formal Accessibility Policy found.
B. The organization providing the online materials has an accessibility statement.	Fail
Additional Information:	No Accessibility Statement found.
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	No Accessibility Evaluation Report 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 text to speech check. Pages 1-5 checked.

3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
Additional Information:	5/5 pages passed size adjustment check. Pages 1-5 checked. Adobe Acrobat Pro XI was used.
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,	Pass



media player, or reader) that offers this functionality).	
Additional Information:	5/5 pages passed adjust font and colors check. Pages 1-5 were checked. Adobe Acrobat Pro XI was used.

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:	5/5 pages passed reflow check. Pages 1-5 were checked. Adobe Acrobat Pro XI was used.
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	Pass
Additional Information:	5/5 pages match printed material page numbers. Pages 1-5 were checked. Adobe Acrobat Pro XI was used.

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.	Pass
Additional Information:	5/5 pages read in correct order. Pages 1-5 checked. Adobe Acrobat Pro XI was used.

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	Fail
--	-------------



such as a browser, media player, or reader that offers this functionality).	
Additional Information:	1/4 criteria passed navigation text check. Tagged PDF, Title, and Headings criteria failed accessibility checker. Adobe Acrobat Pro XI was used.
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:	Accessibility checker failed list check. Adobe Acrobat Pro XI was used.
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:	No eReader application used.

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:	0/5 tables passed markup check. All of the tables checked had no markup, simply ready from top of column to the bottom. Pages 297-299, 302, and 303 were checked. Accessibility checker tool failed table check. Adobe Acrobat Pro XI was used.



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>30/30 navigation links passed. Pages 72-75, 79, 81, 83, 84, 87, 88, and 90 were checked. Adobe Acrobat Pro XI was used.</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>Average of Functionality and Description.</p>
<p>C. Live links take you to the correct webpage that is functioning properly.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>18/20 links passed functionality check. Pages i-iii, iv, 22, A-14(5links), A-15, A-16(3 links), A-17, A-18(4 links), A-19 checked. Page 22 link was in Russian, and Page A-15 link not active. Adobe Acrobat Pro XI was used.</p>
<p>D. Live links are descriptive enough for the users to know where it should take them.</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/20 links passed description checked. Pages i-iii, iv, 22, A-14(5links), A-15, A-16(3 links), A-17, A-18(4 links), A-19 checked. All links are depicted as URLs. Adobe Acrobat Pro XI was used.</p>

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>Pass</p>
<p>Additional Information:</p>	<p>25/25 pages passed color redundancy check. Pages 10-35 checked. Navigation links do not have color redundancy but they are used sparingly within pages. Adobe Acrobat Pro XI was used.</p>



B. Information is conveyed from the sub-categories for contrast.	Pass
Additional Information:	Average of Header, Text, and Simple images.
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	Pass
Additional Information:	25/25 pages passed header contrast check. All headers are black text on white background. Pages 10-34 checked. Adobe Acrobat Pro XI and Colour Contrast Analyser Tool used.
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	Pass
Additional Information:	25/25 pages passed text contrast check. Pages 10-35 checked. Almost all text is black on white background. Only navigation text is dark blue on white background. Adobe Acrobat Pro XI and Colour Contrast Analyser Tool were used.
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	Pass
Additional Information:	25/25 pages passed simple image contrast check. Pages i,45, 71, 72, 74, 145(2images), 146(3 images), 147(3 images), 157, 158, 191, 198, 296, 297, 456 checked. Almost all images are black outline figures on white background. Adobe Acrobat Pro XI and Colour Contrast Analyser Tool were used.

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:	Accessibility checker failed primary language check. Adobe Acrobat Pro XI was used.
B. If the digital resource includes passages in a foreign language, these passages include markup that declares the language in a	N/A



manner that is compatible with assistive technology.	
Additional Information:	No foreign language found within entire text. Adobe Acrobat Pro XI was used.

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 passed. Pages 145 (2 images), 146 (3 images), 147 (3 images), 149, and 150 checked. None of the images have adequate descriptions. Accessibility checker failed alternate text check. Adobe Acrobat Pro XI was used.
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	Pass
Additional Information:	Only one decorative image found within entire textbook. Title page image. Accessibility checker failed alternate text check. Adobe Acrobat Pro XI was used.
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 passed. None of the descriptions were adequate. Pages 1, 70, 71 (2 images), 72 (3 images), 73 (3 images), and 74 checked. Accessibility checker failed alternate text check. Adobe Acrobat Pro XI was used.



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 within entire text.
B. A transcript is provided with all audio content.	N/A
Additional Information:	No multimedia found within entire text.
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 within entire text.

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:	Accessibility checker passed screen flicker check. Adobe Acrobat Pro XI was used.

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 markup check. None of the images have adequate markup. Pages 1, 70, 71 (2 images), 72 (2 images), 73 (3 images), and 74 checked. Adobe Acrobat Pro XI was used.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	Fail
Additional Information:	0/10 graphs passed markup check. Pages 35 (3 images), 36, 38, 67, 69, 168 (3 images) checked. All graphs have no markup. Adobe Acrobat Pro XI was used.



<p>C. STEM equations have appropriate markup that indicates that the image is an equation.</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/10 equations passed markup check. Pages 10-20 checked. Equations do not have markup. Pages checked. Adobe Acrobat Pro XI was used.</p>
<p>D. STEM tables have appropriate markup that indicates the image is a table.</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/10 tables passed markup check. All of the tables checked had no markup, simply read from top of column to the bottom. Pages 297-299, 302, and 303-305, 436-438 were checked. Adobe Acrobat Pro XI was used.</p>
<p>E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/10 figures passed notation check. None of the images have adequate notation. Pages 1, 70, 71 (2 images), 72 (2 images), 73 (3 images), and 74 checked. Adobe Acrobat Pro XI was used.</p>
<p>F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/10 graphs had adequate descriptions. Pages 35 (3 images), 36, 38, 67, 69, 168 (3 images) checked. All graphs have no markup. Adobe Acrobat Pro XI was used.</p>
<p>G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/10 equations passed notation markup check. Pages 10-20 checked. Numbers are read as single digits and some parts of the more complex equations are skipped. Pages checked. Adobe Acrobat Pro XI was used.</p>



H. Assistive technology used can access the content from the STEM tables.	
Additional Information:	0/10 tables passed notation check. Pages Pages 297-299, 302, and 303-305, 436-438 were checked. Adobe Acrobat Pro XI was used.

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 found within entire text.
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 found within entire text.
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 found within entire text.

© 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.