

Higher Education from Cambridge University Press

Information for students

Higher Education from Cambridge University Press ([cambridge.org/highereducation](https://www.cambridge.org/highereducation)), is the home for Cambridge textbooks.

Within this website, the Cambridge University Press eReader, Cambridge Spiral, provides access to a full range of eTextbooks, alongside all available supplementary learning materials.

This document is intended for students at an institution with a Cambridge eTextbooks subscription. It will help you login for the first time, and will walk through the functionality for student users.

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How to Log In

Cambridge Spiral, our pedagogically designed eReader, provides digital reading access to the content within the Cambridge Higher Education offering.

There are two options for logging in to enable reading on Cambridge Spiral.

Personal account login (recommended)

“Read-only” access via guest login

Details are provided below on these two options.

A more detailed visualisation of the comparison between these two types of login is also available on our website.

Personal account login (recommended)

By creating a personal account, you will have access to the enhanced functionality within the Cambridge Spiral eReader, including the ability to:

- Make personalised bookmarks, highlights, annotations, and links as you study, then use the Annotations tab to manage and review
- Copy and print up to 20% of any eTextbook
- Login to the Cambridge Spiral App, which enables you to read textbooks online and offline on desktop, mobile and tablet devices. This enables you to download and read textbook content while away from your institution's campus or when you wish to be offline.

Setting up a Personal Higher Education Account

You can set up an account by selecting the 'Register' icon in the top right hand corner of the [Higher Education website](#), or simply **[click here to create an account](#)**

You will be directed to the Cambridge Core platform to fill out a short form asking for your name, institutional email address, organisation and country.

Already have a Cambridge Core account?

If you have been reading Cambridge University Press journals and research books, you may already have a [Cambridge Core](#) account.

You can use the same email address and password details to [login to the Higher Education site](#).

Have you forgotten your login details? Please [request a new password](#).

Features of your Higher Education Account

Once you have registered, you will be able to manage your account through the **My Account** dashboard area. Use the dashboard to manage:

- Your offline bookshelf
- Your bookmarks
- Your order history
- Access Codes that you have used
- Account settings

The screenshot displays the 'My account' dashboard. On the left, a navigation menu lists various account management options. Two items, 'Examination copy requests' and 'Instructor resources requests', are circled in red. The main content area features a 'Welcome Sales' message and detailed instructions for accessing account settings, bookmarks, examination copies, instructor resources, and offline reading titles. A 'Recommended links' section at the bottom provides quick access to user guides, FAQs, and contact information. A user profile dropdown in the top right corner shows the user is logged in as 'Sales D' and includes a 'My account' link.

Using your Personal Higher Education account

How to start reading books within the Textbook Subscription

Log onto your university's library system in the usual way (via your institution's IP authentication, for example Open Athens, Shibboleth, Raven).

Then open a new tab and go to the [Cambridge login page](#), and enter the login details that you set up in the stage above.

Search for books via our [website catalogue](#), or click on a book link that your instructor has provided to you.

To read a book, click the **Read online** button on the book landing page, and if your institution's subscription includes access to this book, this will automatically take you into the Cambridge Spiral eReader.

The screenshot shows the Cambridge University Press website interface. At the top, there is a navigation bar with 'Higher Education from Cambridge University Press' and various menu items like 'Subjects', 'Students', 'Instructors', 'Librarians', and 'About'. Below this, the page title 'Sustainable Engineering: Principles and Practices' is displayed. A search bar is visible on the right side of the page. The main content area features a book cover on the left and a detailed description on the right. The 'Read online' button is circled in red, indicating the next step in the process. Other buttons include 'Purchase additional formats', 'Request instructor examination copy', 'View courseware for instructors', 'Activate access code', 'Share', 'Add to bookmarks', 'Download flyer', and 'Copy LTI link'. The 'Read online' button is located in the 'Access' section, which also includes a 'Textbook' and 'eCollection' toggle. The 'Description' section provides a brief overview of the book's content, mentioning its multidisciplinary perspective and focus on sustainable development. The 'Read more >' link is also present below the description.

Installing the Cambridge Spiral App

The Spiral App will enable you to read online and offline, on campus and off campus.

Mobile and tablet versions of the app are available to download from Apple's App Store and Google Play. Desktop versions are also available to download for Windows and Mac.

[Click here to view the Cambridge Spiral App download links.](#)

When you install the App for the first time, this may take up to 5-10 minutes to complete.

Cambridge Spiral

[Downloads for mobile devices](#) | [Downloads for desktop devices](#)



Cambridge Spiral is our eReader, which allows you to read eBooks online. It is also available as a desktop and mobile application to enable you to download and read Cambridge University Press's vast array of textbooks while away from your institution's campus or when you wish to be offline. You can then use the textbook to study while at home, on the train, in a coffee shop - anywhere you like!

You can find out more about Cambridge Spiral and its features via the menu to the left.

- Compare our web reader's 'read-only' version vs its full version accessible with a free Higher Education from Cambridge University Press account
- Find out about our Group Annotations feature
- Find out more about apps and offline reading features

We also have a demo video of Cambridge Spiral.

Mobile and tablet versions of the app are available to download from Apple's App Store and Google Play. Desktop versions are also available to download for Windows and Mac.

Downloads for mobile devices



Downloads for desktop devices

[Download the Windows app](#) [~130MB, Windows 7 and above]

[Download the Mac app](#) [~100 MB, Mac OS 10.12 Sierra and above]

App Store is a trademark of Apple Inc. Google Play and the Google Play logo are trademarks of Google LLC.

[More information about the Spiral App is available later in this document.](#)

'Read-only' access via guest login

There is an option for 'guest' access that does not require a personal login.

Through 'guest access' login, you can read books on the online web reader using the read-only version of Cambridge Spiral.

The guest login is only available for reading textbooks with internet access only (it does not allow offline reading).

Guest access does not provide access to the advanced functionality of Cambridge Spiral.

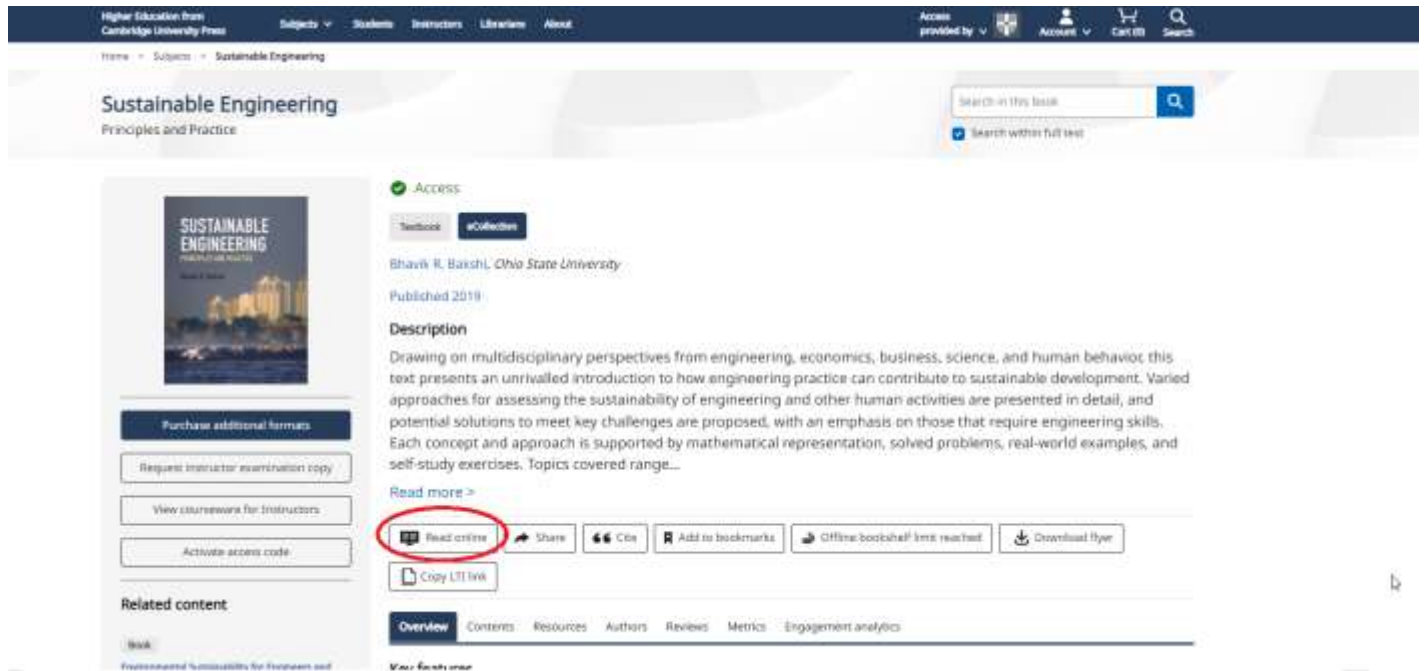
Login as Guest

Log in to your university's library system in the usual way (via your institution's IP authentication, for example Open Athens, Shibboleth, Raven).

Then, go to the Cambridge website where your access will be provided via your library system.

Search for books via our website catalogue, or click on a book link that your instructor has provided to you

To read a book, click the **Read online** button on the book landing page.



The screenshot shows the Cambridge University Press website interface. At the top, there is a navigation bar with links for 'Higher Education Press', 'Cambridge University Press', 'Subjects', 'Students', 'Instructors', 'Librarians', and 'About'. On the right side of the navigation bar, there are links for 'Access provided by', 'Account', 'Cart (0)', and 'Search'. Below the navigation bar, the page title is 'Sustainable Engineering: Principles and Practice'. A search bar is located on the right side of the page. The main content area features a book cover for 'Sustainable Engineering: Principles and Practice' by Bhavik R. Bakshi, Ohio State University, published in 2019. The book is available in 'eBook' and 'eCollection' formats. The 'Description' section states: 'Drawing on multidisciplinary perspectives from engineering, economics, business, science, and human behavior, this text presents an unrivalled introduction to how engineering practice can contribute to sustainable development. Varied approaches for assessing the sustainability of engineering and other human activities are presented in detail, and potential solutions to meet key challenges are proposed, with an emphasis on those that require engineering skills. Each concept and approach is supported by mathematical representation, solved problems, real-world examples, and self-study exercises. Topics covered range...'. Below the description, there is a 'Read more >' link. A red circle highlights the 'Read online' button, which is accompanied by a 'Share' button, a 'Cite' button, an 'Add to bookmarks' button, an 'Offline: toolbar limit reached' button, and a 'Download flyer' button. There is also a 'Copy URL link' button. The 'Related content' section is partially visible at the bottom left. The page footer includes 'Overview', 'Contents', 'Resources', 'Authors', 'Reviews', 'Metrics', and 'Engagement analytics'.

Click **'Continue as guest'** and this will automatically take you into the read-only online Spiral eReader.

The screenshot shows a book page for 'International Criminal Law' by Cassin Latham. The page is divided into several sections:

- Textbook:** A short introductory paragraph about international criminal law, followed by a 'Read more >' link.
- Navigation:** A horizontal menu with links for 'Contents', 'Key features', 'Resources', 'Authors', 'Reviews', 'Metrics', and 'Information'.
- Read this book online:** A blue button that triggers a login modal.
- Login Modal:** A white box with a close button (X) and a message: 'We notice you are not currently logged in to a Cambridge HE user account. Only logged in users will be able to use exclusive features in our eReader, such as bookmarking, copying and printing. You can find out more details on the benefits of having an account here.' It contains two buttons: 'Log in or register' and 'Continue as guest' (highlighted with a mouse cursor).
- Table of Contents:** A table with two columns: 'Add to bookmarks' and 'Read online'. It lists 'Abbreviations' and several chapters (pp 1-4, pp 4-10, pp 10-14, pp 14-17, pp 17-21, pp 21-25).
- Right Sidebar:**
 - Book cover image for 'INTERNATIONAL CRIMINAL LAW' by Cassin Latham.
 - 'Access' and 'Open access' icons.
 - 'Buy the print book' button.
 - Buttons for 'Add to bookmarks', 'Request examination copy', 'Cite this book', and 'Add to offline bookshelf'.
 - Text: 'Offline bookshelf requires installation of an app'.
 - ISBN information: Online ISBN: 9781108209906, Published online: 12 December 2018; Hardback ISBN: 9781108423205, Hardback publication date: 06 December 2018; Paperback ISBN: 9781108423297, Paperback publication date: 06 December 2018; DOI: <https://doi.org/10.1017/9781108209906>.

How to find textbooks on the Higher Education website

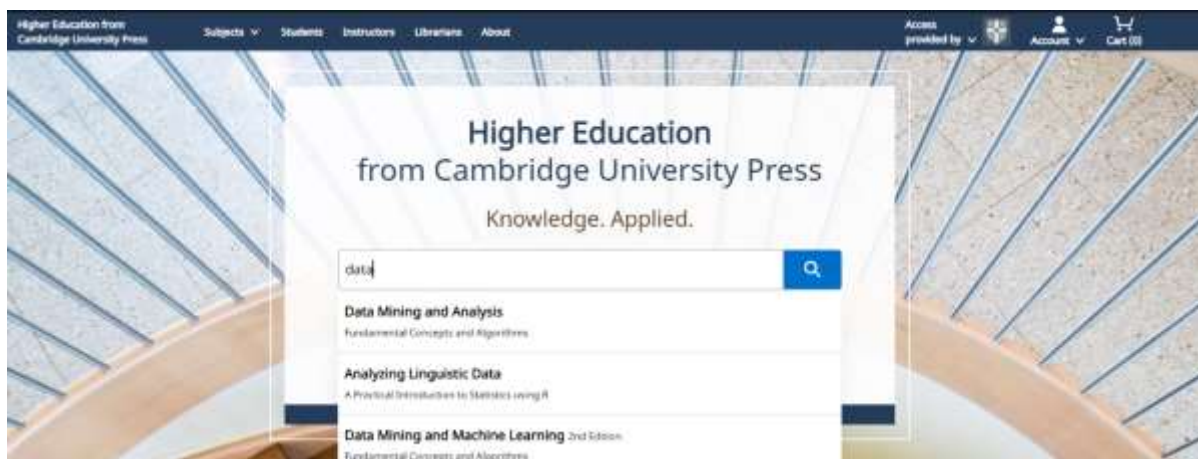
Search on the Homepage

To perform a search, navigate to the [Higher Education website homepage](#).

Enter your terms in the search box, and select the search icon to view your results. Predictive search has been enabled on the search box.

Typing in a search term will return a selection of results with titles relating to the term.

Predictive search also works by author name. You can enter a name and see the selection of titles authored appear under the search bar.



Refining Search Results

You can refine your search results using the filters on the left-hand-side. You can filter by content that you have access to, refine the publication date, and narrow down by sub-subject.

The screenshot shows a search results page for 'data mining' with 136 results. The left sidebar contains a 'Refine search' section with the following filters:

- Access:**
 - Only show content I have access to (136)
 - Online/offline reading available (116)
 - Print book only (16)
- Author:** e.g. John Smith
- Publication date:**
 - Over 3 years (67)
 - Last 3 years (54)
 - Last 12 months (18)
 - Last 6 months (11)
 - forthcoming (5)
- from year:** e.g. 1771
- To year:** e.g. 1998
- Subject:** Earth and Environmental

The main content area shows two book results:

136 results for data mining Relevance

Can't find the content you are looking for?
To expand your search, find other books and research journals at [Cambridge Core](#), or browse our catalogue at [cambridge.org](#)

Page 1 of 7 First < Previous **1** 2 3 4 5 Next > Last

Data Mining and Analysis
Fundamental Concepts and Algorithms
1st edition
Munemul J. Zaki, Elvezio P. de Azeiteiro, New York, Wileon Mena, J., Universidade Federal de Minas Gerais, Brazil
Online ISBN: 9780511815114
Online publication date: 28 May 2018
Read online [View Resources](#) [Request to purchase](#) [Purchase](#) [Export citation](#)
Textbook **eCollection** **Access**
[View description](#)

Data Mining and Machine Learning
Fundamental Concepts and Algorithms
2nd edition
Munemul J. Zaki, Elvezio P. de Azeiteiro, New York, Wileon Mena, J., Universidade Federal de Minas Gerais, Brazil
Online ISBN: 9781108564175
Online publication date: 07 February 2020
Hardback ISBN: 9781108425889
Hardback publication date: 19 January 2020
Read online [View Resources](#) [Request to purchase](#) [Purchase](#) [Export citation](#)
Textbook **eCollection** **Access**
[View description](#)

[Feedback](#)

The green **Access icon** will show you if you have access to the textbook digitally within your institution's subscription.

Search

206 results for sustainable engineering Relevance

Can't find the content you are looking for?
To expand your search, find other books and research journals at Cambridge Core, or browse our catalogue at cambridge.org

Page 1 of 11 First < Previous **1** 2 3 4 5 Next > Last

Sustainable Engineering
Principles and Practice
Shawk R. Bakshi, Ohio State University
Online ISBN: 9781108333726
Online publication date: 04 June 2019
Hardback ISBN: 9781108420457
Hardback publication date: 13 June 2019

[Read online](#) [View resources](#) [Request instructor examination copy](#) [Email citation](#)

Textbook: **eCollection** **Access**

[View description](#)

Aerodynamics for Engineers
5th edition
John T. Bertin / IS Air Force Academy; Russell M. Cummings / IS Air Force Academy

Subject area search

To see a selection of our latest textbooks and a list of subjects that we publish, scroll down the [homepage](#). You will see a list of subject areas.


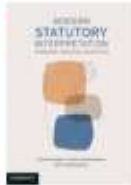






When you click on a subject area, you will be taken to a page with more sub-subject areas to browse.

Subjects

Anthropology	Education	Literature
Archaeology	Engineering	Mathematics
Area Studies	Film, Media, Mass Communication	Music
Art	General	Philosophy
Business and Management	General Science	Physics and Astronomy
Chemistry	Geography	Politics and International Relations
Classical Studies	Health and Medicine	Psychiatry
Computer Science	History	Psychology
Drama, Theatre, Performance Studies	Language and Linguistics	Religion
Earth and Environmental Sciences	Law	Sociology
Economics	Life Sciences	Statistics and Probability

New titles

[View all](#)

							
Textbook Parker and Eavis's <i>Inside Lawyers' Ethics</i> 4th edition Wesley Holmes, Australia	Textbook Modern Statutory <i>Interpretation</i> Jeffrey Barrow, La Trobe University, Victoria, Australia	Textbook Pragmatics in English Kate Scott, Kingston University, London	Textbook Psychopathology Kenneth Carbon, Johns University, Atlanta	Textbook Language in Culture Michael Silverstein, University of Chicago	Textbook Network Models for <i>Data Science</i> Alan Jansen, Aarhus University	Textbook A Sourcebook on Equity and Trusts in Australia 3rd edition Michael Bryan, University of	Textbook The Psychology of <i>Poverty, Wealth, and Economic Inequality</i> Dimitris Galas, London School

Textbook Landing Pages

By selecting a specific book, you will be taken to its landing page. Here, you can find information about the book (e.g., table of contents, author details, reviews, prices, and ISBN as well as any relevant metrics).

The landing page also enables you to buy an individual print copy of the textbook should you want to.

The screenshot shows the landing page for the textbook 'Sustainable Engineering: Principles and Practice' by Bhavik R. Bakshi. The page is part of the Cambridge University Press Higher Education platform. The header includes navigation links for Subjects, Students, Instructors, Librarians, and About, along with account and cart information. The main content area features the book cover, a search bar, and a 'Purchase additional formats' button. Below the cover are buttons for 'Request instructor examination copy', 'View courseware for Instructors', and 'Activate access code'. The 'Access' section indicates the book is available as a 'Textbook' and 'eCollection'. The description highlights the book's multidisciplinary approach to sustainable development. A row of action buttons includes 'Read online', 'Share', 'Cite', 'Remove from bookmarks', 'Remove from offline bookshelf', and 'Download flyer'. The 'Related content' section lists other books on sustainability and climate change. The 'About the book' section provides technical details like DOI, ISBN, dimensions, and page count.

Higher Education from Cambridge University Press

Subjects ▾ Students Instructors Librarians About

Access provided by Account ▾ Cart (2) Search


Home > Subjects > Sustainable Engineering

Sustainable Engineering

Principles and Practice

Search in this book:

Search within full text



Purchase additional formats

Request instructor examination copy

View courseware for Instructors

Activate access code

Related content

Book

[Environmental Sustainability for Engineers and Applied Scientists](#)
Greg Peters, Magdalena Svanström
Online publication date: 28 February 2019

Book

[Climate Change 2014: Mitigation of Climate Change](#)
Intergovernmental Panel on Climate Change
Online publication date: 05 February 2015

Book

[Thermodynamics and the Destruction of Resources](#)
Bhavik R. Bakshi, Timothy G. Gutowski, Dušan P. Sekulić
Online publication date: 01 June 2011

Powered by UNSILO

Access

Textbook eCollection

Bhavik R. Bakshi, *Ohio State University*

Published 2019

Description

Drawing on multidisciplinary perspectives from engineering, economics, business, science, and human behavior, this text presents an unrivalled introduction to how engineering practice can contribute to sustainable development. Varied approaches for assessing the sustainability of engineering and other human activities are presented in detail, and potential solutions to meet key challenges are proposed, with an emphasis on those that require engineering skills. Each concept and approach is supported by mathematical representation, solved problems, real-world examples, and self-study exercises. Topics covered range...

[Read more >](#)

Read online Share Cite Remove from bookmarks Remove from offline bookshelf Download flyer

Copy LTI link

Overview Contents Resources Authors Reviews Metrics Engagement analytics

Key features

- Has multidisciplinary appeal, with perspectives from engineering, economics and the social sciences
- Adaptable to students from a range of backgrounds, covering both introductory as well as mathematically rigorous advanced topics
- Benefits from nearly 100 worked examples and over 200 end-of-chapter exercises

About the book

DOI	https://doi.org/10.1017/9781108333726		
Subjects	Chemical Engineering , Engineering , Engineering: General Interest		
Format: Hardback	Publication date: 13 June 2019	Dimensions (mm): 246 x 189 mm	Page extent: 490 pages
	ISBN: 9781108420457	Weight: 1.21kg	Availability: Available
		Contains: 187 b/w illus. 87 tables	

Resources

Resources are supplementary materials available to use with textbooks. If a textbook has a Resources tab, Resources exist for that title and can be viewed via that tab.

There are two types of resources: General Resources, which are free to download without restrictions, and Instructor Resources which are not accessible for student users.

Note: If the Resources tab is not visible, then no resources are available for that title.

Sustainable Engineering
Principles and Practice

Search in this book
 Search within full text

Access

Bhavik R. Bakshi, *Ohio State University*
Published 2019

Description
Drawing on multidisciplinary perspectives from engineering, economics, business, science, and human behavior, this text presents an unrivalled introduction to how engineering practice can contribute to sustainable development. Varied approaches for assessing the sustainability of engineering and other human activities are presented in detail, and potential solutions to meet key challenges are proposed, with an emphasis on those that require engineering skills. Each concept and approach is supported by mathematical representation, solved problems, real-world examples, and self-study exercises. Topics covered range...

[Read more >](#)

Related content

Book
Environmental Sustainability for Engineers and Applied Scientists

Overview Content **Resources** Authors Reviews Metrics Engagement analytics

How to use additional resources?

Website functionality and tools

Bookmarking

You can select **Add to Bookmarks** to enable you to easily find the textbook you are interested in again.

You must be logged in to a personal account to use bookmarks.

The screenshot displays the Cambridge University Press website interface for the textbook 'Sustainable Engineering: Principles and Practice'. The page includes a navigation bar at the top with links for 'Subjects', 'Students', 'Instructors', 'Librarians', and 'About'. A search bar is located in the top right corner. The main content area features the book cover on the left and a detailed description on the right. The 'Add to bookmarks' button is highlighted with a red circle. Below the description, there are several action buttons: 'Read online', 'Share', 'Cite', 'Add to bookmarks', 'Add to offline bookshelf', and 'Download flyer'. A 'Copy LTI link' button is also present. The page is categorized as 'Textbook' and 'eCollection'.

You can find your bookmarked textbooks in **My Account**.

The screenshot shows the 'My account' page on the Cambridge University Press website. The top navigation bar includes 'Higher Education from Cambridge University Press', 'Subjects', 'Students', 'Instructors', 'Librarians', and 'About'. On the right, there are links for 'Access provided by', 'Account', 'Cart (0)', and 'Search'. The user is logged in as 'Sales D', and the 'My account' dropdown menu is open, with 'My account' highlighted. The left sidebar contains a list of account management options: Dashboard, Access codes, Account settings, Order history, **Bookmarks** (highlighted with a red circle), Examination copy requests, Instructor resources requests, KBART, MARC records, Offline bookshelf, and Usage statistics. The main content area is titled 'Bookmarks' and contains a message: 'Below is a list of Higher Education content you have bookmarked. Add additional content to this list by clicking on the 'Add to bookmarks' button on any content page.' Below this is a 'Recently bookmarked' dropdown menu and a 'Filter by content type:' section with buttons for 'All bookmarks (27)', 'Textbooks (18)', and 'Chapters (11)'. A 'Select all | Deselect all' link is also present. The first bookmarked item is 'Sustainable Engineering: Principles and Practice' by Shweta R. Bhatia, Ohio State University, dated 10 January 2023. The item details include ISBNs, publication dates, and a 'Remove' button.

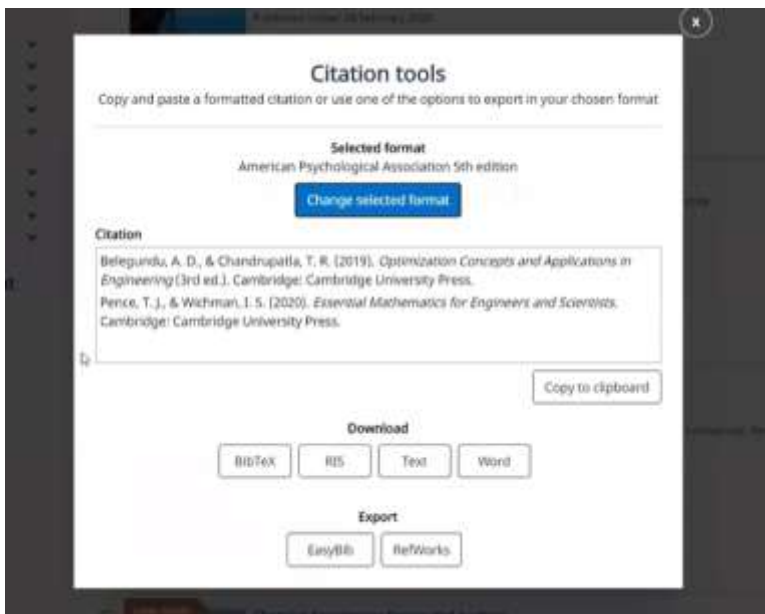
Citations

Watch [this video](#) to see how citations work.

Export citation functionality is conveniently located on multiple pages throughout the website.

From the citation tool pop up you can change the citation style by using the **change selected format** button.

You can copy and paste, or download the citation, or export to various citation tools.



Deep links: referencing textbooks or individual chapters with ease

Deep link functionality helps students to easily reference or link to specific parts of a textbook, and it does this in a very granular way.

How to find deep links

On a book landing page, there is a tab to view 'Contents'.

Navigate to the chapter within this table of contents that you wish to link to, by clicking on the title of the chapter.

The screenshot shows the landing page for the textbook "Sustainable Engineering: Principles and Practice" by Bhavik R. Bakshi, Ohio State University. The page features a search bar at the top right and a navigation menu on the left. The main content area includes a description of the book, a "Description" section, and a "Contents" tab that is circled in red. Below the "Contents" tab, a table of contents is displayed, with "Part I - Introduction and Motivation" circled in red. The table of contents lists the following items:

Item	Icon	Page Range
Part I - Introduction and Motivation	📖	1-1-2
1 - The Basis of Human Well-being	📖	1-1-10

For example, this is the landing page for Part I of this textbook.

You will see the option to 'Copy Deep Link' via a button on the right hand side of the screen.

The screenshot displays the Cambridge University Press website interface for the textbook 'Sustainable Engineering: Principles and Practice'. The top navigation bar includes 'Higher Education from Cambridge University Press' and links for 'Subjects', 'Students', 'Instructors', 'Librarians', and 'About'. The main header features the book title and a breadcrumb trail: 'Home > Subjects > Sustainable Engineering > Introduction and Motivation'. The central content area is titled 'Part I: Introduction and Motivation' and includes an 'Access' section with 'Chapter' and 'eCollection' buttons. Below this, the author 'Shavik R. Balesh, Ohio State University' is listed. A row of action buttons includes 'Read online', 'Share', 'Cite', 'Add to bookmarks', 'Add to offline bookshelf', and 'Copy deep link', with the latter being circled in red. A 'Copy LTI link' button is also present. The 'Overview' tab is selected, showing a 'Summary' section with a message: 'A summary is not available for this content. Please use the Read Online link above to access this content.' The 'About the book' section provides DOI links for the chapter and the book. A 'Contents' sidebar on the left lists the book's structure, including 'Part I: Introduction and Motivation' and its two chapters.

Reading a book (Cambridge Spiral eReader)

Once you have selected a textbook, follow the next steps to start reading online!

You can also watch these instructions in a [video format](#).

To access the Spiral eReader, click the **Read online** button on the book landing page.

The screenshot shows the Cambridge University Press website interface for the book 'Sustainable Engineering: Principles and Practice' by Bhavik R. Bakshi. The page includes a navigation bar at the top with links for 'Subjects', 'Students', 'Instructors', 'Librarians', and 'About'. A search bar is located in the top right corner. The main content area features the book cover on the left and a detailed description on the right. The 'Read online' button is highlighted with a red circle. Below the description, there are several action buttons: 'Share', 'Cite', 'Remove from bookmarks', 'Remove from offline bookshelf', and 'Download flyer'. The 'Related content' section on the left lists other books by the author, including 'Environmental Sustainability for Engineers and Applied Scientists'.

Higher Education from
Cambridge University Press

Subjects ▾ Students Instructors Librarians About

Access provided by Account Cart Search

Home ▾ Subjects ▾ Sustainable Engineering

Sustainable Engineering

Principles and Practice

Search in this book

Search within full text

Access

Textbook **eCollection**

Bhavik R. Bakshi, Ohio State University

Published 2019

Description

Drawing on multidisciplinary perspectives from engineering, economics, business, science, and human behavior, this text presents an unrivalled introduction to how engineering practice can contribute to sustainable development. Varied approaches for assessing the sustainability of engineering and other human activities are presented in detail, and potential solutions to meet key challenges are proposed, with an emphasis on those that require engineering skills. Each concept and approach is supported by mathematical representation, solved problems, real-world examples, and self-study exercises. Topics covered range...

Read more >

Read online Share Cite Remove from bookmarks Remove from offline bookshelf Download flyer

Copy LTI link

Overview Contents Resources Authors Reviews Metrics Engagement analytics

Key features

- Has multidisciplinary appeal, with perspectives from engineering, economics and the social sciences
- Adaptable to students from a range of backgrounds, covering both introductory as well as mathematically rigorous advanced topics

Related content

Book

Environmental Sustainability for Engineers and Applied Scientists

Book Details | Marketplace | Overview

Online publication date: 28 February 2019

Book

Functionality within Spiral eReader

The following instructions feature the Spiral eReader with full functionality.

To enable this functionality, you will need to be logged in via your personal account.

See instructions at the start of this document on [how to create your personal account](#).

Adding Bookmarks

To add a bookmark, select the bookmark feature on the top right and click the text to drop the bookmark in.



Bookmark menu

From the bookmark menu, you can view, edit or delete bookmarks.



The screenshot displays a user interface with a dark blue header bar at the top. On the left side, there is a 'My Bookmark' panel with a search icon, a close button, and a list of bookmarks. The first bookmark is 'PART 1 Introduction and Motivation', and the second is '2 Status of Ecosystem Goods and Services', which is highlighted with a red circle. Below the list are two entries labeled 'Bookmark 1' and 'Bookmark 2', each with a date '10/01/23' and edit/delete icons. The main content area on the right shows a document page titled '2 Status of Ecosystem Goods and Services'. The page includes a quote by E. O. Wilson: 'Every country can be said to have three forms of wealth: material, cultural and biological. The first two we understand very well, because they are the substance of our everyday lives. Biological wealth is taken much less seriously. This is a serious strategic error, one that will be increasingly regretted as time passes.' Below the quote is a paragraph of text starting with 'As we learned in Chapter 1, ecosystems provide the goods and services that are essential for sustaining human activities. Without inputs from nature, neither societal nor economic activities can be sustained. Therefore, the well-being of ecosystem is of critical importance for the well-being of human beings. In this chapter, we will explore the status of ecosystem goods and services. We will consider how human development has relied on various natural resources, and the impact of this reliance on their supply and on our environment. Such insight is needed to assess whether the enhancement in human well-being over the previous decades can be sustained. It will also help in identifying underlying reasons for trends in ecosystem services and potential solutions to ensure their sustained availability. We will first consider the status of essential ecosystem goods such as fuels, materials, water, and food, and then selected ecosystem services such as the regulation of climate, air and water quality, primary productivity, and pollution. We will end this chapter with a look at the overall global status of ecosystem goods and services.'

Creating Annotations

To use any of the annotation features, **drag your cursor over the text you wish to highlight** and the pop up will appear.

Highlighting: Click the highlights button, and choose the colour you wish to apply from the dropdown.

Weblinks: Click the 'Weblink' button to add a link to any url on the internet.

Hyperlinks: Click the 'Hyperlink' button to link to any part of the textbook that you're reading.

Notes: Click the 'Note' button to add a note to the text.

Coping and Printing: Click the 'Copy' button to copy up to 20% of the textbook. This will allow you to copy the text in order to paste onto another document or to print your selection.



The screenshot displays a digital textbook page titled "2.1 Fuels". A toolbar at the top right contains five icons: Note, Highlights, Weblink, Hyperlink, and Copy, all of which are circled in red. Below the toolbar, the text discusses the dominance of fossil fuels since the Industrial Revolution. A line graph, labeled "Figure 2.1", plots "Energy consumption TW/yr" on the y-axis (ranging from 10,000 to 60,000) against time on the x-axis. The graph shows four lines: Oil, Coal, Gas, and Renewable. Oil, Coal, and Gas show a steady upward trend, while the Renewable line shows a much slower, dashed upward trend.

Energy Source	Approximate Consumption (TW/yr)
Oil	15,000 to 50,000
Coal	15,000 to 45,000
Gas	15,000 to 40,000
Renewable	10,000 to 35,000

Editing Annotations: Annotations Menu

You can view, edit or delete annotations from the annotations menu on the left hand side.

The screenshot shows a document viewer interface. On the left, there is an 'Annotations' panel with a search bar and a list of notes. The first note is highlighted with a red circle. The main document area displays the title '2.1 Fuels' and the following text:

Until the Industrial Revolution, the main fuel used by humanity was biomass. This changed dramatically in the last 200 years owing to the dominance of fossil fuels. **These fuels are important ecosystem goods**, produced from ancient biomass that was buried and transformed by planetary processes in an oxygen-starved reducing environment. The resulting products of coal, natural gas, and crude oil are highly concentrated hydrocarbons and carbon that have a high fuel value and can be transformed quite easily into many other products.

Recent trends in fuel consumption, shown in Figure 1.1, depict the dominant role of fossil fuels. These fuels are nonrenewable because their rate of extraction is much greater than their rate of production. Thus, the consumption of nonrenewable resources must result in their depletion over time.

Figure 1.1 is a line graph showing 'Energy consumption TWh/yr' on the y-axis (ranging from 0 to 60,000) and years on the x-axis (1965, 1975, 1985, 1995, 2005, 2015). The graph shows five data series: Oil, Coal, Gas, Renewable, and Nuclear. Oil, Coal, and Gas show a steady increase over time, with Oil reaching the highest consumption level by 2015. Renewable and Nuclear show much lower consumption levels, with Nuclear remaining near zero.

Year	Oil	Coal	Gas	Renewable	Nuclear
1965	15,000	10,000	5,000	5,000	0
1975	25,000	15,000	10,000	5,000	0
1985	30,000	20,000	15,000	5,000	0
1995	35,000	25,000	20,000	5,000	0
2005	40,000	30,000	25,000	5,000	5,000
2015	45,000	35,000	30,000	5,000	10,000

Printing pages

You can use the print icon in the top right hand corner to print out a portion of the book.

ecosystem goods and services.

Print

2.1 Fuels

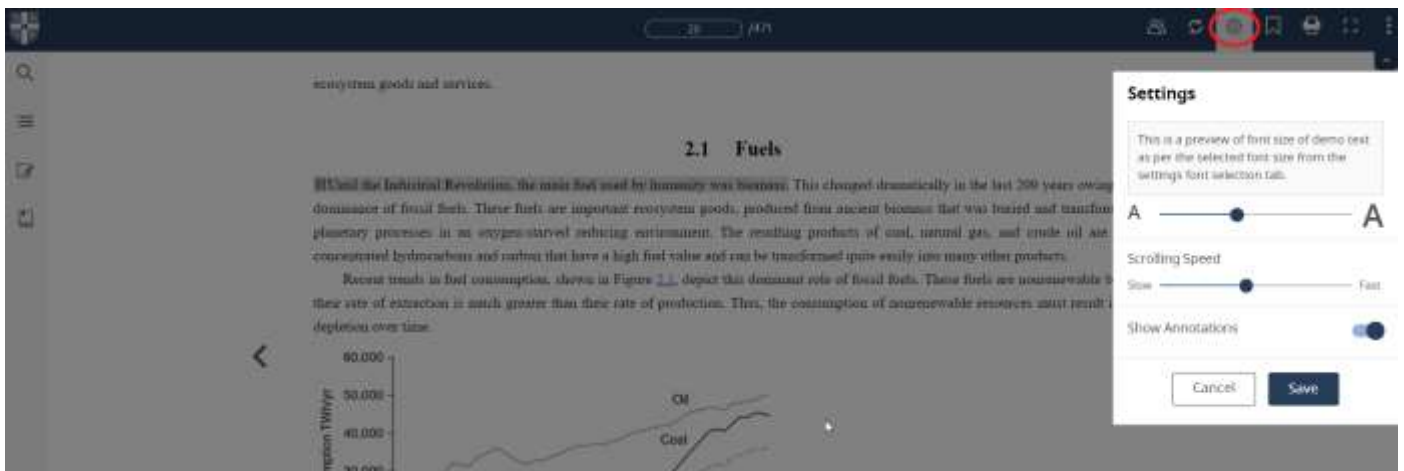
Until the Industrial Revolution, the main fuel used by humanity was biomass. This changed dramatically in the last 200 years owing to the dominance of fossil fuels. These fuels are important ecosystem goods, produced from ancient biomass that was buried and transformed by planetary processes in an oxygen-starved reducing environment. The resulting products of coal, natural gas, and crude oil are highly concentrated hydrocarbons and carbon that have a high fuel value and can be transformed quite easily into many other products.

Recent trends in fuel consumption, shown in Figure 2.1, depict this dominant role of fossil fuels. These fuels are nonrenewable because their rate of extraction is much greater than their rate of production. Thus, the consumption of nonrenewable resources must result in their depletion over time.

Year	Oil (TWh/yr)	Coal (TWh/yr)	Gas (TWh/yr)
1900	10,000	20,000	5,000
1920	15,000	25,000	10,000
1940	20,000	30,000	15,000
1960	25,000	35,000	20,000
1980	30,000	40,000	25,000
2000	35,000	45,000	30,000
2020	50,000	45,000	35,000

Increasing the font size

You can increase the font size on the page within the settings tab in the top right hand corner.



The screenshot shows a document viewer interface. The main content area displays a section titled "2.1 Fuels" with text describing fossil fuels and a line graph showing consumption trends. A settings menu is open in the top right corner, titled "Settings". The menu includes a preview of the font size, a "Scrolling Speed" slider, and a "Show Annotations" toggle. The font size is currently set to a medium level, and the "Save" button is highlighted.

ecosystem goods and services.

2.1 Fuels

Until the Industrial Revolution, the main fuel used by humanity was biomass. This changed dramatically in the last 200 years owing to the dominance of fossil fuels. These fuels are important ecosystem goods, produced from ancient biomass that was buried and transformed by planetary processes in an oxygen-starved reducing environment. The resulting products of coal, natural gas, and crude oil are concentrated hydrocarbons and carbon that have a high fuel value and can be transformed quite easily into many other products.

Recent trends in fuel consumption, shown in Figure 2.1, depict this dominant role of fossil fuels. These fuels are nonrenewable and their rate of extraction is much greater than their rate of production. Thus, the consumption of nonrenewable resources must result in depletion over time.

60,000
50,000
40,000
30,000

Oil
Coal

mpson TWh/yr

Settings

This is a preview of font size of demo text as per the selected font size from the settings font selection tab.

A ————— A

Scrolling Speed

Slow ————— Fast

Show Annotations

Cancel Save

Group Mode: Accessing a group using a Group Code

If you have prescribed reading for a course, your instructor may provide annotations on this text for you to view within the Cambridge Spiral eReader.

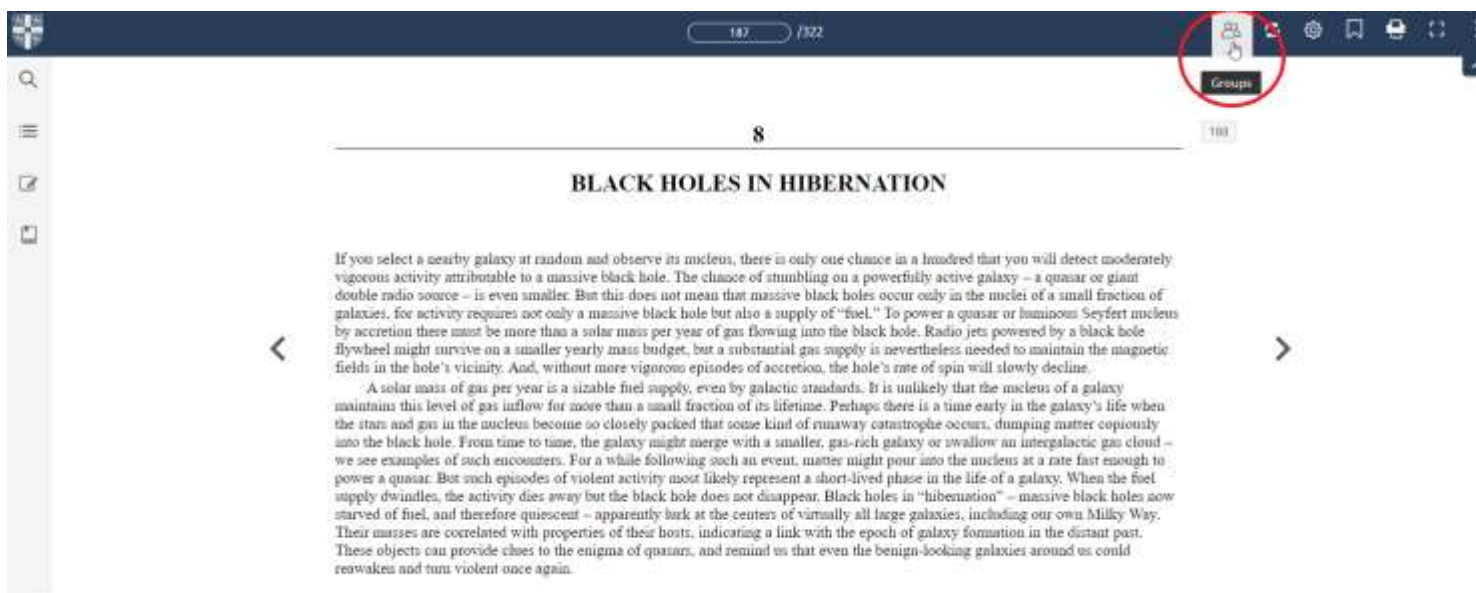
To access the instructor annotations, please follow these steps:

Login to your Cambridge Higher Education account

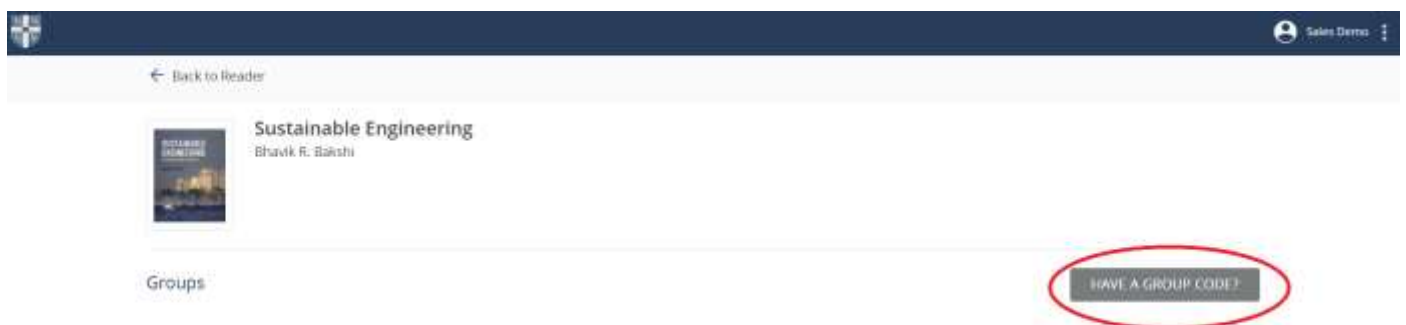
Navigate to the landing page of your prescribed textbook on the Higher Education website

Click the **Read Online** button. This will take you into the Cambridge Spiral eReader.

Click on the 'Groups' icon in the top right hand corner



Select 'Have a Group Code?'.



Enter the Group Code that has been supplied to you by your instructor.

Once this has been entered, you will be able to view your instructor's annotations within your textbook.

Your own personal student annotations will be private and will not be shared with the Group.

Textbook Resources and Supplementary Materials

Your textbook may be accompanied by free supplementary materials, which can be accessed via the textbook's product page on the Higher Education website.

Navigate to the “Resources” tab. If student materials are available for this textbook, they will be stored in the General Resources drop down, and you will be able to download all those that do not have a padlock symbol next to them.

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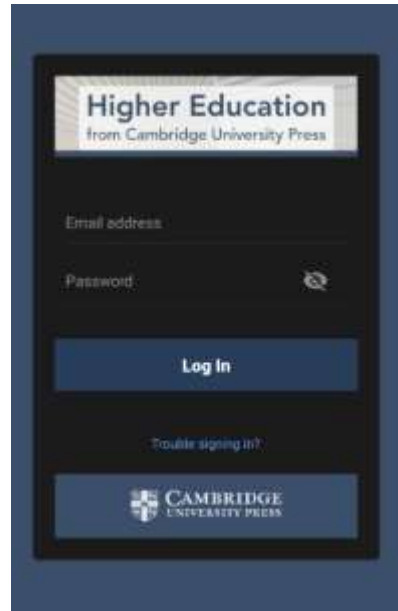
When you first open the Spiral App, you will be prompted to enter your login details and create as per the instructions earlier in this document.

Log in page (Windows app)



The screenshot shows the login page for the Windows app. At the top, it says "Higher Education from Cambridge University Press". Below that is a "Log in" heading. There are two input fields: "Email Address" and "Password". A "Log in" button is positioned below the password field. A link for "Trouble signing in?" is located below the button. At the bottom, the Cambridge University Press logo is displayed.

Log in page (Android app)



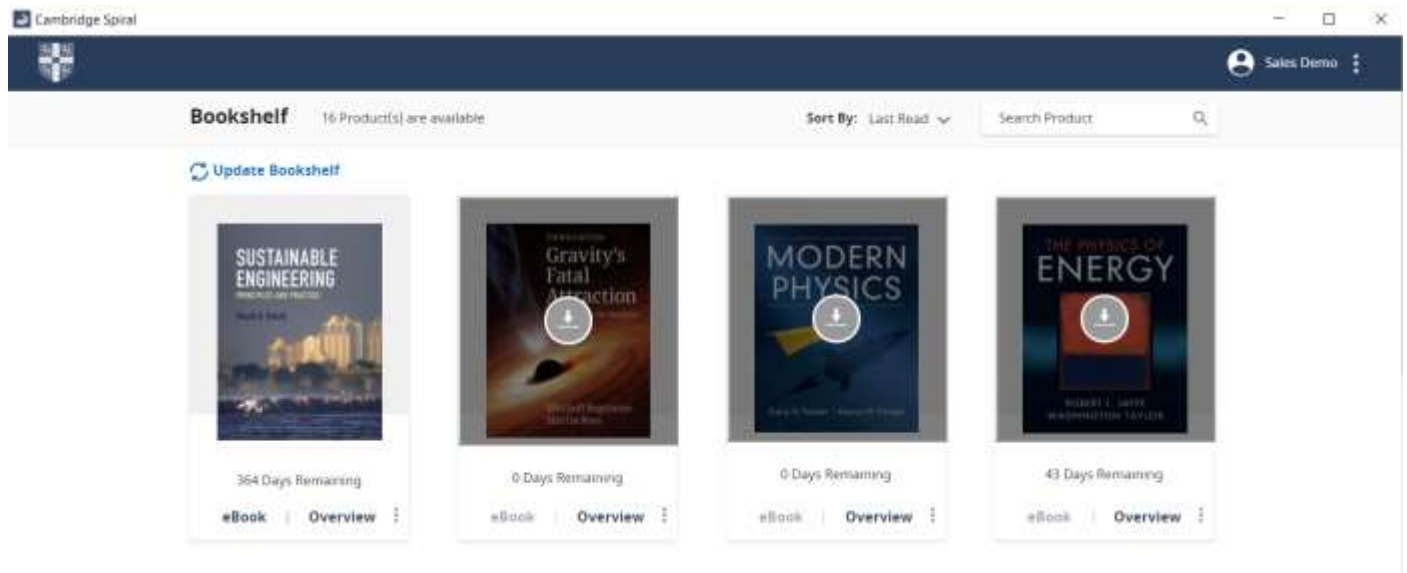
The screenshot shows the login page for the Android app. It features a dark theme. At the top, it says "Higher Education from Cambridge University Press". Below that is a "Log in" heading. There are two input fields: "Email address" and "Password". A "Log in" button is positioned below the password field. A link for "Trouble signing in?" is located below the button. At the bottom, the Cambridge University Press logo is displayed.

Offline and Online reading

The Spiral App allows online and offline reading.

When you open the Cambridge Spiral app, you will see your bookshelf, with titles you have recently read.

You can choose to make titles available for offline reading by clicking on the grey offline icon in the centre of the cover.



Adding books to your offline bookshelf

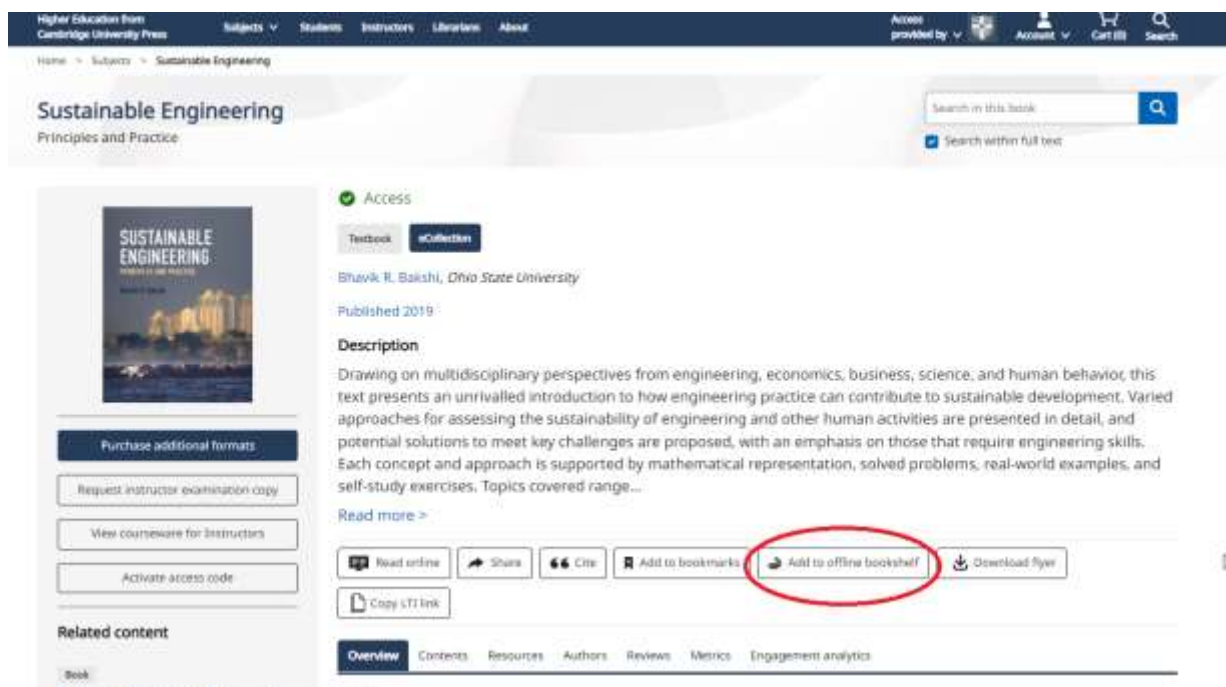
You may have up to 20 books in your offline bookshelf at the same time.

To add a book to your offline bookshelf, navigate to the landing page of the textbook on the Cambridge Higher Education website.

Click the button **“Add to offline bookshelf”**.

This will ensure that you will be available for you to read the textbook online and offline, on campus and off campus, within the Spiral App.

Please note that you will need to install the Spiral App prior to using this feature.



The screenshot displays the Cambridge Higher Education website interface for the textbook 'Sustainable Engineering: Principles and Practice'. The page includes a navigation bar at the top with links for 'Subjects', 'Students', 'Instructors', 'Librarians', and 'About'. A search bar is located in the top right corner. The main content area features the book cover on the left and a detailed description on the right. The 'Add to offline bookshelf' button is highlighted with a red circle. Other visible buttons include 'Read online', 'Share', 'Cite', 'Add to bookmarks', and 'Download flyer'. The 'Access' section indicates that the book is available for offline use.

Sync functionality

When reading offline, the “sync” button can be used to ensure that any annotations that you add while reading offline will be synced within account once you are back online again.



The screenshot shows the Cambridge Spiral interface. At the top, there is a dark blue header with the Cambridge Spiral logo on the left, a page number '207 / 471' in the center, and a toolbar on the right. The toolbar includes icons for search, sync, and other functions. The 'Sync' button is highlighted with a red circle. Below the header, the main content area displays the chapter title '11 Footprint Assessment' and a sub-section '11.1 Carbon Footprint'. The text on the page discusses sustainability assessment and the concept of a footprint.

Cambridge Spiral

207 / 471

Sync

11

Footprint Assessment

We forget that the water cycle and the life cycle are one.

Jacques Cousteau

In sustainability assessment, the term *footprint* refers to the direct and indirect environmental impact of an activity represented in terms of a single unit. This approach has been popular owing to its relative simplicity and to focus on important environmental challenges such as climate change, freshwater scarcity, and exceeding planetary biocapacity. In this chapter we will learn about two commonly used methods, based on either the carbon footprint or the water footprint. We will also understand the shortcomings of the footprint approach and the nexus between multiple footprints.

11.1 Carbon Footprint

Interest in the carbon footprint has been driven by concerns about anthropogenic climate change due to emission of greenhouse gases and

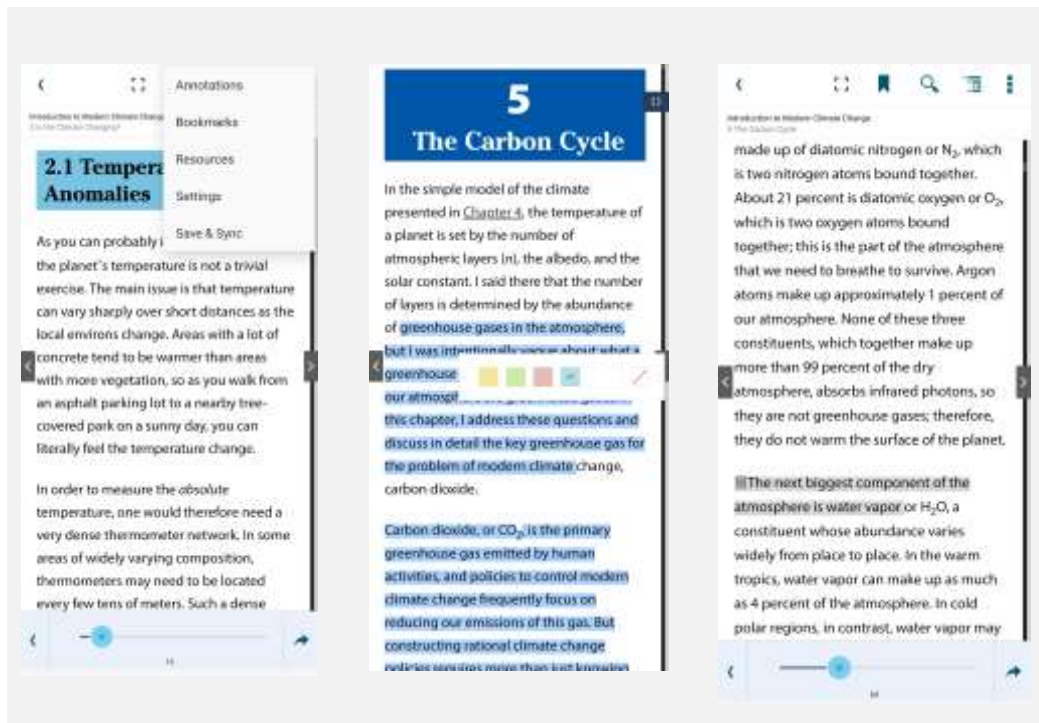
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