TeachBook (Chemistry Sciences Template)

Álvaro Lozano Murciego y André Sales Mendes (USAL)

Feb 10, 2026

CONTENTS

I Tutorial **3**

1 What is a TeachBook? **5**
- 1.1 Key Features . . . 5
- 1.2 Why use this template? . . . 5
- 1.3 Underlying Technology . . . 5

2 Editing Workflow **7**
- 2.1 Recommended Steps . . . 7
- 2.2 Tools . . . 7

3 Editing with AI **9**
- 3.1 Prompts for the Assistant . . . 9
- 3.2 Prompt Example . . . 9

4 Web Publication **11**
- 4.1 Steps to publish . . . 11

II Examples by Degree **13**

5 Degree in Physics **15**
- 5.1 Physics Example: Harmonic Oscillator . . . 15

6 Degree in Mathematics **17**
- 6.1 Mathematics Example: Symbolic Calculus . . . 17

7 Degree in Statistics **19**
- 7.1 Statistics Example: Data Generation . . . 19

III Information **21**

8 About **23**
- 8.1 Authors . . . 23
- 8.2 Contexto . . . 23
- 8.3 Year . . . 23

9 Licenses **25**
- 9.1 Content . . . 25
- 9.2 Code . . . 25
- 9.3 Attributions . . . 25

10 How to Cite **27**
10.1 Text Citation 27
10.2 BibTeX 27
10.3 DOI 27

Welcome to the **TeachBook Sciences Template**.

What is this?

This is a template designed for the faculty of the **Faculty of Sciences at USAL** to create interactive teaching books easily.

Content

In this book you will find:

- *Tutorials* to learn how to use the template
- *Examples by Degree* to see real cases
- Information on *how to cite* and *licenses*

Note: This project is designed to be used with **VS Code** and **AI** assistants.

Part I

Tutorial

CHAPTER

ONE

WHAT IS A TEACHBOOK?

A **TeachBook** is an interactive open educational resource designed to facilitate learning.

1.1 Key Features

- **Web Format**: Accessible from any device (computer, tablet, mobile).
- **Interactive**: Allows execution of code (Python) directly in the browser.
- **Downloadable**: Can be exported to PDF for offline reading.

1.2 Why use this template?

This template is pre-configured with:

1. **USAL Design**: Colors and typography aligned with the corporate identity.
2. **Tools**: Includes `matplotlib`, `numpy`, `pandas` ready to use.
3. **AI Integration**: Designed to be edited with the help of AI assistants. from the source code.

1.3 Underlying Technology

This project uses Jupyter Book, a standard tool in the scientific community.

CHAPTER

TWO

EDITING WORKFLOW

The workflow with **TeachBook** is designed to be simple and efficient.

2.1 Recommended Steps

1. **Write content**: Use Markdown or Notebooks (`.ipynb`).
2. **Preview**: Run `python scripts/preview_book.py` to see changes in real-time.
3. **Commit & Push**: Use the Git extension in VS Code to save your work.
4. **Deploy**: GitHub Actions will automatically publish the updated version.

2.2 Tools

- **VS Code**: Main editor.
- **Jupyter Extension**: For editing notebooks interactively.
- **GitHub**: For version control and hosting.
- `_toc.yml`: Table of Contents.
- `_config.yml`: General configuration.

CHAPTER

THREE

EDITING WITH AI

This template is optimized for use with Artificial Intelligence assistants (like GitHub Copilot, ChatGPT, or Claude).

3.1 Prompts for the Assistant

You can ask the assistant to:

- “Create a new chapter about Thermodynamics.”
- “Add a matplotlib graph to visualize this function.”
- “Correct the style of this paragraph.”

The assistant knows the project structure thanks to the `Agent.md` file.

3.2 Prompt Example

> “Create a code cell that plots the standard normal distribution using matplotlib.”

The AI will give you the code and you just have to run it or include it in your book.

CHAPTER

FOUR

WEB PUBLICATION

Publication is done automatically through **GitHub Pages**.

4.1 Steps to publish

1. Ensure your repository is public (or you have access to GitHub Pages in private).
2. Make changes to your content.
3. Save changes with a **Commit** and **Push** to the main branch (`main`).
4. A "GitHub Action" will run automatically and build your book.
5. In a few minutes, you will see your updated book at your repository URL (configured in Settings > Pages).

Part II

Examples by Degree

CHAPTER

FIVE

DEGREE IN PHYSICS

In this section, you will find examples adapted to Physics Degree courses. The goal is to show how to integrate:

- Complex mathematical formulas
- Plots of physical simulations
- Experimental data analysis code

5.1 Physics Example: Harmonic Oscillator

This notebook simulates a simple harmonic oscillator.

```
import numpy as np
import matplotlib.pyplot as plt

# Parameters
k = 1.0  # Spring constant
m = 1.0  # Mass
omega = np.sqrt(k / m)
t = np.linspace(0, 20, 100)

# Position
x = np.cos(omega * t)

# Plot
plt.figure(figsize=(8, 4))
plt.plot(t, x)
plt.title('Simple Harmonic Oscillator')
plt.xlabel('Time (s)')
plt.ylabel('Position (m)')
plt.grid(True)
plt.show()
```

CHAPTER

SIX

DEGREE IN MATHEMATICS

Examples for mathematics courses. Priorities here include:

- Rigor in mathematical notation (LaTeX)
- Visual proofs
- Symbolic algorithms (SymPy)

6.1 Mathematics Example: Symbolic Calculus

We will use SymPy to differentiate and integrate functions.

```
from sympy import symbols, diff, integrate, sin, exp

x = symbols('x')
f = exp(-x) * sin(x)

# Derivative
df = diff(f, x)
print(f"Derivative: {df}")

# Indefinite Integral
int_f = integrate(f, x)
print(f"Integral: {int_f}")
```

CHAPTER

SEVEN

DEGREE IN STATISTICS

Examples oriented towards data analysis and probability. Highlights:

- DataFrame handling (Pandas)
- Statistical visualization (Seaborn)
- Probabilistic models

7.1 Statistics Example: Data Generation

We generate a normal distribution and visualize its histogram.

```
import numpy as np
import matplotlib.pyplot as plt

data = np.random.normal(0, 1, 1000)

plt.hist(data, bins=30, alpha=0.7, color='green', density=True)
plt.title('Normal Distribution Histogram')
plt.xlabel('Values')
plt.ylabel('Density')
plt.show()
```

Part III

Information

CHAPTER

EIGHT

ABOUT

8.1 Authors

Facultad de Ciencias Universidad de Salamanca (USAL)

8.2 Contexto

This book is part of the teaching innovation project for the integration of digital tools in science teaching.

8.3 Year

2025

CHAPTER

NINE

LICENSES

9.1 Content

All text and image content (unless otherwise stated) is distributed under a **Creative Commons Attribution 4.0 International (CC BY 4.0)** license.

9.2 Code

Source code examples are distributed under the **MIT** license.

9.3 Attributions

This project uses:

- Jupyter Book
- The Turing Way (as inspiration)

CHAPTER

TEN

HOW TO CITE

If you use this material, please cite it as follows:

10.1 Text Citation

> Faculty of Sciences (2025). *TeachBook Sciences Template*. University of Salamanca. Available at: [Repository URL]

10.2 BibTeX

```bibtex
@book{teachbook_sciences_2025,
  author = {Faculty of Sciences},
  title = {TeachBook Sciences Template},
  year = {2025},
  publisher = {University of Salamanca},
  url = {https://github.com/user/repo}
}
```

10.3 DOI

(Pending assignment via Zenodo)