

SUIT UP YOUR SCIENCE!

A design course by Efrén Álvarez Salvado

The overall goal of this course is to teach students how to create quality graphics with scientific data. This includes three specific goals:

1. To learn how to organize information so that it's appealing and easy to understand.
2. To learn graphic design principles that will make scientific graphics clearer and professional-looking.
3. To learn how to use vector graphics software to digitally produce graphics. The three options recommended and used as reference will be *Adobe Illustrator*, *Affinity Designer* and *Inkscape*.

These goals are roughly translated on the structure of the course, and in every part there will be activities to help assimilate and practice the concepts that are being taught. Moreover, the time each of these three parts will take during the lessons has been determined according to the level of interest shown by prospective students at the Institute via a survey.

Regarding the practical use of specialized software, it will be the tool that students use to finally bring all the concepts together when they create their graphics. As such, my intention is for them to understand how this type of software works (its principles and fundamentals), as well as how to handle digital assets and how to use the most important and useful tools within the software. Because nowadays there are several competitive software options in the market, we will focus on functions that are present in all of them and different ways to solve design problems that researchers frequently encounter, rather than providing an in-depth guide for one specific software. In the end, the course will equip students to independently use any software of their choice, and to further learn on their own according to their tools and their level of use.

My expectation is that all the skills and methods learned during the course will help students to communicate their work more clearly and concisely, allow them to reach a wider audience and to have a better impact in the scientific community and in society. The course is intended for researchers, and all topics will be approached from the perspective of what can be useful and applicable for them.

Contents of the course

The following table of contents is a broad overview of the intended topics to cover in the course.

1. Design before design

We will briefly explore the reasons why design is beneficial and worth implementing in scientific communication. Then we will talk about the process of planning our graphics: the very important steps that go before we sit down to actually make graphics.

- What is design and how can it help researchers?
- The process of design
- Who is your audience?
- The four levels of depth in communication
- Defining your message

2. Making graphics

We will learn the fundamentals of graphic design, and how to apply them to create clear, functional and aesthetic graphics.

- Principles of graphic design
- Color
- Typography

3. Designing data

We will review different aspects of typical research figures, and learn how to improve them visually, using the design principles learned previously.

- Axes, labels, legends, and other figures' elements
- Types of charts and when to use them

4. Making a story with graphics

We will review different principles of information design and how they are applied to scientific graphics to improve the quality of communication.

- The importance of aesthetics
- Visual communication
- Clarity and negative space
- Hierarchy and flow
- Showing relationships

5. Tools for the job

We will start by learning a workflow to produce figures with vector graphics software. We will then learn to operate the software, and its most important and fundamental functions.

IMPORTANT: Learning will not be tied to one specific software; all the concepts and functions taught will apply to any software that students choose, and will be practiced during the course as we learn them. The instructor has experience with, and will recommend, the following applications (which should provide a good array of options for students): *Adobe Illustrator*, *Affinity Designer* and *Inkscape*.

- Why use vector graphics software?
- Recommended workflow
- Recommended software
- Vector graphics versus bitmaps
- Working in real sizes
- Selection, grouping and aligning
- Layers
- Pen tool: cutting and illustrating
- Managing colors

Organization of the course.

The course will have two parts.

1. The first part will consist of lectures, intended to be clear and concise, in which the students will learn concepts. Within the lectures there will be time to practice and see those concepts in action.

- This part of the course will take place during six days, with six sessions of approximately 1 hour 45 minutes of duration. The lessons will be ordered to allow students to start practicing and applying the new concepts as soon as possible.

2. The second part of the course will be optional for students .

It will comprise a work session and a review session. During the work session students will have time to create their own graphics using the tools and techniques learned in the lessons. The instructor will be present and accessible to help and provide feedback. In the review session, those students who want to will show their work to be discussed openly by the group. Between the instructor and their colleagues, students will receive systematic and real feedback on how well their graphics are made and how effectively they communicate the intended message.

The work session will have 4 hours, during which students are free to join and will have the instructor and other students available. The review session will last approximately 2 hours, and attendance will be encouraged to all students (including those who didn't participate in the work session), as everyone can benefit and learn from real case-studies and it will help understand the concepts learned.

The time distribution of this second part of the course will be accommodated to attendance and students' preferences, being possible to start the review session earlier if all students are ready.

Additionally, students will have access to the instructor during the whole course, in order to clarify concepts and get feedback. Depending on interest, it is possible that a private social media group will be created to allow the students to engage in discussions, share questions and get feedback about their work.