

UNIVERSITY OF CALIFORNIA, DAVIS

This presentation was made possible by NIH grant R25MH080794

# **Online Course Materials**

#### **Steve Luck**

Center for Mind & Brain University of California, Davis

These slides are shared under the terms of a Creative Commons license (<u>CC BY-SA 4.0</u>).

Briefly, you are free to copy, share, remix, transform, and build upon these materials in any way you desire. However, you are required to give appropriate credit, and if you share the resulting materials, you must distribute your contributions under the same CC BY-SA 4.0 license. Please credit us as: ("by Steven J. Luck, https://erpinfo.org/").

#### Intro to ERPs An Online Course

- Introduction to ERPs, designed for advanced undergrads and grad students
  - Learn how to read and evaluate ERP papers
  - Background info for students working in an ERP lab
- 8 "chapters" each with several 5-minute videos
  - 1-2 quiz questions following each 5-minute video
- Videos are hosted on YouTube with a Creative Commons attribution license
- Quiz questions and lecture notes are available by request
- Canvas course available by request
- Video source files (ScreenFlow) available by request





ERP INFO HOME ERP BOOT CAMP ERPLAB TOOLBOX ERP CORE RESOURCES READINGS BLOG

Course Materials: Intro to ERPs

These materials were created for our free online course, introduction to ERPs. This course was designed for students who want to learn the basics of ERPs. We anticipate that it will take most students 5-10 hours to complete.

This page provides the individual course components so you can use them in your own courses, whether you have an entire course devoted to ERPs, a single day focused on ERPs, or something in between. The materials have a Creative Commons CC BY license so that you can use them in any way you want. You just need to provide an attribution ("by Steven J. Luck, https://erpinfo.org/"). The versions provided here don't have the ERP Boot Camp "branding" that you'll see in our full online course.

The course consists primarily of a series of 5-minute lecture videos hosted on YouTube (including closed captioning for ADA compliance). You can simply use the YouTube links below. Please contact us if you need the original .mp4 files or the ScreenFlow source files (which would allow you to edit the videos, add your own content, etc.). We can also provide you with transcripts for the videos.

The videos are organized into "chapters," each of which contains 4-8 videos. You can use any or all of the videos. If you're going to use more than a few, we recommend that you keep them in their current order. The first five chapters focus on what ERPs are and how they're used, and the last three chapters focus on the methodological information that students need to learn so that they can read, understand, and critically evaluate ERP papers and/or start working in an ERP lab. We promote best practices in ERP research via workshops, software, books, advice, data sharing, & methods development.

#### Steve Luck

lucklab.ucdavis.edu mindbrain.ucdavis.edu/people/sjluck Østevenjluck Google Scholar Profile

#### Emily Kappenman

emilykappenman.org Øemilykappenman Google Scholar Profile

**Blog Categories** 

÷

0 9 🖾

#### https://erpinfo.org/intro-to-erps-course-materials



Getting students excited about ERPs

Can be customized for your course



- Chapter 2.1. EEG and Frequency bands
- Chapter 2.2. Averaging, flow of info through the brain
- Chapter 2.3. Detailed Example: N170 and perceptual experience
- Chapter 2.4. SNR and number of trials
- Chapter 2.5. Sources of noise
- Chapter 2.6. Conventions: 10/20 system and plotting

![](_page_6_Picture_1.jpeg)

- Chapter 3.1. What is an ERP component?
- Chapter 3.2. Component naming conventions
- Chapter 3.3. Sensory components: C1, P1, N1, Auditory, MMN
- Chapter 3.4. Attention (N2pc, including threat)
- Chapter 3.5. Working Memory (CDA and WM face decoding)
- Chapter 3.6. Language (N400)
- Chapter 3.7. Categorization and Emotion (P3, LPP)

![](_page_7_Picture_1.jpeg)

- Chapter 4.1. From Source to Scalp: The forward problem
- Chapter 4.2. From Scalp to Source: Basics of the inverse problem
- Chapter 4.3. Source localization approaches
- Chapter 4.4. Challenges in source localization
- Chapter 4.5. Difference waves
- Chapter 4.6. Example of difference waves (N170 development)

![](_page_8_Picture_1.jpeg)

- Chapter 5.1. Continuous high temporal resolution
- Chapter 5.2. ERP Latencies: P3
- Chapter 5.3. ERP Latencies: N2pc and LRP
- Chapter 5.4. Example: P3 Latency in Schizophrenia

![](_page_9_Picture_1.jpeg)

- Chapter 6.1.
  - . Fourier Analysis & Fundamental Principle #1
- Chapter 6.2. Filtering
- Chapter 6.3. Fundamental Principle #2
- Chapter 6.4. Time-frequency analysis
- Chapter 6.5. Fundamental Principle #1 in Time-Frequency Analysis
- Chapter 6.6. Time-frequency Example
- Chapter 6.7. Epoching and Baseline correction
- Chapter 6.8. Overlap

![](_page_10_Picture_1.jpeg)

- Chapter 7.1. Participants, Stimuli, & Task
- Chapter 7.2. Recording
- Chapter 7.3. Active, Reference, & Ground
- Chapter 7.4. Choosing a Reference Location
- Chapter 7.5. Common Artifacts
- Chapter 7.6. Artifact Rejection and Correction
- Chapter 7.7. Summary of EEG/ERP Processing Steps
- Chapter 7.8. Choosing Time Windows and Electrode Sites

![](_page_11_Picture_1.jpeg)

- Chapter 8.1. Noisy data
- Chapter 8.2. Small Effects and Replication
- Chapter 8.3. Baseline problems and artifacts
- Chapter 8.4. Analysis problems
- Chapter 8.5. Design & Interpretation Problems, Part 1
- Chapter 8.6. Design & Interpretation Problems, Part 2

![](_page_12_Figure_0.jpeg)

ERP INFO HOME ERP BOOT CAMP ERPLAB TOOLBOX ERP CORE RESOURCES READINGS BLOG

090

#### Course Materials: Intro to ERPs

These materials were created for our free online course, introduction to ERPs. This course was designed for students who want to learn the basics of ERPs. We anticipate that it will take most students 5-10 hours to complete.

This page provides the individual course components so you can use them in your own courses, whether you have an entire course devoted to ERPs, a single day focused on ERPs, or something in between. The materials have a Creative Commons CC BY license so that you can use them in any way you want. You just need to provide an attribution ("by Steven J. Luck, https://erpinfo.org/"). The versions provided here don't have the ERP Boot Camp "branding" that you'll see in our full online course.

The course consists primarily of a series of 5-minute lecture videos hosted on YouTube (including closed captioning for ADA compliance). You can simply use the YouTube links below. Please contact us if you need the original .mp4 files or the ScreenFlow source files (which would allow you to edit the videos, add your own content, etc.). We can also provide you with transcripts for the videos.

The videos are organized into "chapters," each of which contains 4-8 videos. You can use any or all of the videos. If you're going to use more than a few, we recommend that you keep them in their current order. The first five chapters focus on what ERPs are and how they're used, and the last three chapters focus on the methodological information that students need to learn so that they can read, understand, and critically evaluate ERP papers and/or start working in an ERP lab. We promote best practices in ERP research via workshops, software, books, advice, data sharing, & methods development.

#### Steve Luck

lucklab.ucdavis.edu mindbrain.ucdavis.edu/people/sjluck Østevenjluck Google Scholar Profile

#### Emily Kappenman

emilykappenman.org Øemilykappenman Google Scholar Profile

**Blog Categories** 

÷

#### https://erpinfo.org/intro-to-erps-course-materials