

Subject: Welcome to ECE 8527
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To: "ECE 8527: Google" <temple-engineering-ece8527@googlegroups.com>

Welcome to the Spring 2023 version of ECE 8527 – Introduction to Machine Learning and Pattern Recognition. The class web site is available at:

http://www.isip.piconepress.com/courses/temple/ece_8527/

The syllabus for this semester is not online yet, for reasons I'll explain shortly. However, all previous semesters I have taught this course are available from the class web site. Please review those if you want to understand what is in this course.

This semester I am going to make several significant updates to the course. We will use a new textbook:

<https://www.cambridge.org/us/academic/subjects/computer-science/pattern-recognition-and-machine-learning/machine-learning-first-course-engineers-and-scientists?format=HB>

For many years I have taught this course without a textbook because a suitable textbook was not available. However this book looks to be a treatment that is very consistent with my view of this course, so I am excited to integrate this book into the course.

There are few good, contemporary textbook for this course. The books out there tend to skew towards one particular approach, such as neural networks, and don't present a balanced view (IMHO). This book is much more balanced.

We will also refer to an older book that is considered one of the definitive textbooks on this topic:

R.O. Duda, P.E. Hart, and D.G. Stork
 Pattern Classification
 Wiley Interscience, ISBN: 0-13-022616-5, 2001.
 URL: https://docs.google.com/file/d/0B78A_rsP6RDSVjBTa1ZUSXBGYzA/edit

This is available online at the above URL. It is still an excellent book.

Students have traditionally struggled with the computer assignments. Since this is essentially a graduate course (we often have a few undergrads in it, but not this semester), you are expected to be able to program and to know how to run extensive computer simulations. You will need to use your personal laptop, though lab-based Linux machines will also work for the Python coding.

This is a very valuable course for those of you interested in doing this type of research. I feel the course is more about the philosophy of how you do machine learning research than the specific approaches. The techniques and software change regularly, but the underlying concepts (e.g., "There is no data like more data.") are really important.

The approach I take in teaching this course is somewhat unique, but based on what I think you need to know after spending 40+ years in this field. In this first course we will try to address the underlying concepts, and save the details, such as the intricacies of deep learning, for later courses.

At the end of the semester we will hold a competition to see who can achieve the best performance classifying data drawn from an interesting data set. The Spring 2022 results are available here:

https://www.isip.piconepress.com/courses/temple/ece_8527/exams/2022_00_spring/exam_04/

There are links to the reports the students wrote. This web page will give you a good idea of what this course is all about.

I hope you have a great semester. I promise to do my part to make sure you are overwhelmed and overworked 😊

-Joe