ECE 8560: PATTERN RECOGNITION
Spring 2017
Course Syllabus

Format

Section 001, 2:00-3:15 TuTh, 300 Riggs.

Instructor

Dr. R.J. Schalkoff, 334 EIB, *rjschal@g.clemson.edu*, (864)-656-5913.

Text

Schalkoff, *Pattern Recognition: Statistical, Syntactic and Neural Approaches*, John Wiley and Sons, NY, 1992, ISBN 0-471-52974-5.

Prerequisites

Some familiarity with probability, random variables, and linear algebra. See text Appendices 1 and 2. I will review this in lecture.

Attendance

Probably necessary for success. You are responsible for anything discussed in class.

Web Use

We will use Canvas. You will find this syllabus as well as other related materials and resources on the course Canvas page. *Be sure you can access this, since it will be the conduit for handouts, takehome assignments and other interaction.* This repository will evolve over the semester.

Office Hours

11-12 M,Tu,W,Th. Others by appointment.

COURSE OUTLINE[1]

I. PART 1: INTRODUCTION AND GENERAL PATTERN RECOGNITION CONCERNS

    A. What is Pattern Recognition (PR)?

    B. Pattern Recognition Approaches

    C. Examples of PR Applications

    D. Pattern Recognition Extensions

II. PART 2: STATISTICAL PATTERN RECOGNITION (StatPR)

    A. Introduction to StatPR

    B. Supervised, Parametric Approaches

    C. Unsupervised Approaches

III. PART 3: SYNTACTIC (STRUCTURAL) PATTERN RECOGNITION (SyntPR)

    A. Introduction to SyntPR

    B. Structural Analysis Using Constraint Satisfaction and Structural Matching

    C. The Formal Language-based Approach to SyntPR

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[1]See the text Table of Contents for more detail.

D. Learning/Training in the Language-based Approach (Grammatical Inference)

IV. PART 4: NEURAL PATTERN RECOGNITION (NeurPR)

    A. Feedforward Networks for Classification
    B. Other Related Neural Approaches and Extensions

Grading

In-class Quizzes (3) and Takehome Assignments (3): 100 %. **Takehome Assignments and Quizzes are individual efforts**.
The Quiz schedule is as follows:

In-Class Quiz Dates

- Quiz 1: 2/21

- Quiz 2: 3/28

- Quiz 3: Course Final Exam Date: Thursday, 5/4, 8:00-9:15 AM.

You are expected to take the in-class quizzes at the scheduled times, unless there are extenuating circumstances and arrangements are made in advance.

Takehome Assignment Due Dates

Takehome	Assigned	Due
1	1/26	2/16
2	2/23	3/16
3	3/30	4/20

Notes on Takehome Assignments

- Assignments are be submitted directly to Canvas **before the deadline.** These are the ones we grade. As described below, a 0 grade is assigned to late (missing) assignments. Do not send your archive to me by email after the deadline has passed.

- Be sure to follow all instructions in the Assignment document, especially regarding archive contents and documentation format.

- There is a 0-credit Takehome #0, which is simply a test of your ability to submit an Assignment to Canvas. This must be completed for you to continue in the class. For most students, it takes less than 10 minutes.

- We assume what you submit to Canvas is not an 'opening bid', rather it is your best and final solution to an Assignment.

- Multiple submissions: Canvas allows multiple submissions for a graded Assignment prior to the deadline. If you submit multiple archives for an Assignment, **we will open and grade ONLY the latest (i.e., most recent)**.

- **We grade (only) what you submit**, not what you meant to submit, corrections to what you did submit, etc. This is occasionally a huge conceptual stumbling block for a small number of students.

- A late submission is recorded as a 0 grade. Canvas does a nice job of enforcing this. Deadlines and schedules matter.

- A corollary is: we don't grade what you didn't submit, with the exception of the following:

- **If you don't submit anything (or an empty archive), you will receive a 0.** We will not 'chase down a solution', or prod you to submit it, or remind you it was due. Taking this course is voluntary, as is your Canvas submission.

A Procedure to Keep Your Progress in ECE 8560 in Check

All questions about an in-class quiz or an Assignment grade must be brought

to my attention no later than **1 week** *after the quiz or Assignment is returned. This 1 week time limit does not change because you did not attend one or more classes. Thus, do not expect reconsideration for quizzes and assignments at the end of the course (possibly because you 'need points').*

Relevant Topics

Each time this course is offered, I emphasize certain topics which I feel are both timely and of significant interest to the audience. Spring 2017 possibilities include, but are not restricted to:

- ICA

- Fuzzy c-means and fuzzy classification

- Support Vector Machines (SVM)

- Hidden Markov Models

Title IX Statement

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Additional Remarks:

The *Clemson Announcements* contains additional information and guidelines on a number of important and related topics, including attendance, special needs and **academic integrity**. These guidelines are incorporated into ECE 8560 by reference.

My teaching philosophy may be summarized in these remarks:

- The class (you) and I are 'in this together' for the session. **However, your progress is up to you**. Sometimes we can have fun with the material; sometimes work is required. Not everything can be made simple or fun.

- Academic integrity is a serious issue.

- All our interactions should be conducted within a framework of mutual respect.