Duke Electrical and Computer Engineering Course Syllabus

Instructor:	Henry Pfister	**E-mail:**	henry.pfister@duke.edu
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Class Room:	Hudson Hall 125	**Class Time:**	MW 1:45 - 3:00 PM

Course Name: **ECE 487**

Course Title: **System Design for Machine Learning and Signal Processing**

Prerequisite(s): ECE Core, ECE Statistics, ≥ 2 SPC&C Electives (e.g., ECE 480 and ECE 580)

Suggested Text(s): *Applied Software Project Management* by Greene and Stellman

Course Objectives:

This is a design course where small groups of students work through the design process for a machine learning and/or signal processing system. The first few weeks of this course will consist of brainstorming for project ideas and reviewing modern techniques in machine learning and signal processing. The remaining weeks will consist of breaking into groups, choosing projects, and implementing projects. Modern collaboration tools and techniques (e.g., Git, Docker, and cloud computing) will also be introduced via reading assignments and discussions. This course will focus on developing the skills to:

1. describe the basic ideas behind a range of modern techniques in machine learning and signal processing
2. plan and execute a major design project in a group setting
3. use modern development tools and techniques that allow collaborative group design and development
4. schedule human and material resources for project execution by setting and maintaining achievable goals, deadlines, and budgets
5. create and deliver oral and written technical presentations documenting a design project

Student Evaluation:

Brainstorming and Reading Assignments	10%	Tutorial Assignments	15%
Individual Assessment	15%	Group Design Documents	20%
Group Project Report	20%	Group Project Demo	20%

Rules and Guidelines:

The class shall follow all established policies of Duke University.

Course Topics:

Unit	Topics	Hours
1	Machine Learning / Neural Networks	5
2	Development / Collaboration Tools	2.5
3	Ideation / Brainstorming	2.5
4	Software Design	2.5
5	Status Updates	5
6	Group Work	15
7	Design Reviews / Demos	2.5
	Total Hours	35

Schedule:

Date	Topic	Assignments	Notes
01/11/23	Introduction	Shared Bio Doc, Walkthrough 1	
01/18/23	Computing Walkthrough		
01/23/23	Brainstorm	Shared Brainstorm Doc, Walkthrough 2	
01/25/23	Brainstorm	Start Design Reading	Drop/Add Ends
01/30/23	Form Groups	Walkthrough 3	
02/01/23	Project Vision	Start Vision Document	
02/06/23	Cloud Computing	Cloud Computing Walkthrough	
02/08/23	Group Work		
02/13/23	Group Work	Start Agile Development Reading	zoom
02/15/23	Present Vision		zoom
02/20/23	Group Work		zoom
02/22/23	Group Work		zoom
02/27/23	Status Update		
03/01/23	Group Work		
03/06/23	Group Work		
03/08/23	Status Update		Next week spring break
03/20/23	Group Work		
03/22/23	Group Work		
03/27/23	Status Update		
03/29/23	Group Work		Last withdraw with W
04/03/23	Group Work		
04/05/23	Group Work		
04/10/23	Group Work		
04/12/23	Design Review		
04/17/23	Group Work		
04/19/23	Group Work		
04/24/23	Demo / Presentation?		
04/26/23	LDOC		

Demo / Presentation during:
Final Exam 9:00 AM - Noon on Tuesday, May 2nd