CS-4981 Deep Learning In Signal Processing				
Draft Outline				
Week	Day 1	Lab	Day 2	Project Milestones
1	Course Introduction; DL Intro: classification/regression, loss functions: binary cross-entropy/MSE	5%: Get a Rosie account; MATLAB Deep Learning Toolbox: Run 1 or 2 "Get Started" Examples; summarize what was done and your key questions	DSP Intro: Signal types (audio, position/acceleration, image, video, …), Nyquist, sampling, quantization, LTI (linear, time-invariant) systems and difference equations, detection/enhancement/denoising	
2	DL: The training pipeline, overfitting, confusion matrices (accuracy, precision, recall, etc.)	10%: Rosie / MATLAB Lab TBD	DSP: system response, convolution, as projection onto basis functions (linear algebra)	5%: Topic Selection, Identify 3+ References
3	DL: Fully connected layers (FC), activations (nonlinear), NN as robust function approximation, generalization	10%: Rosie / MATLAB Lab TBD	DSP: frequency content and response, Discrete Fourier Transform (DFT), FFT	
4	DL: Convolutional layers (conv1d, etc.)	10%: Rosie / MATLAB Lab TBD	TBD / catch up	15% Background Paper: Summarize references, propose implementation approach (data source, outline work to be done)
5	DL: Common network architectures	Project work	DSP: spectrograms and windowing	
6	DL: Model quantization	Project work	DSP: inverting the spectrogram, perfect reconstruction	10% Preliminary results, updated work plan
7	DL: TBD: Autoencoders, augmentation, transfer learning, or …	Project work	TBD	10% Presentation Draft: Slides, and notes, mostly complete, final results may be pending
8				
9	Project Presentations			10% Presentation Execution
10				15% Writeup of final results
11	Finals Week			
	https://msoe.dev/	Rosie guide, getting an account		
	https://durant.io/	Professor's web site, schedule, course materials		