Suggested syllabus :

* Linear Regression. Maximum likelihood estimator. Online linear regression.(This section is important for actor critic method)
* Perceptron, SVM.
* Ridge, Lasso regression.
* SVM Feature selection(RBF, polynomic, …)
* Course of dimensionality and embedding. Show solution PCA,CNN(future)
* Multi layers networks Bias/variance tradeoff. Vanish/exploding gradients problem in deep nets.
* reduce overfitting using regularization, dropout, data augmentation, normalization input.
* Optimization algorithms : momentum, RMSprop, Adam, newton method. Learning rate decay, mini batch gradient descent.
* CNN classification

Control:

* LQR iLQR and DDP.
* Model base RL and MPC version 0.5-2
* Dynamic programing, A star algorithm, value iteration, policy iteration.
* Actor critic with linear function approximation.
* Policy gradient, variance reduction using DP methods.

Hw:

1. Linear regression Cirrhosis\_death\_rate database.(sklearn and write there own functions)
2. SVM feature selection compare iris dataset.(sklearn )
3. Building multi layers code, implement adam , use tensorflow.
4. Compare SVM, multi layers, and CNN over Mnist digits database.
5. Implement LQR/iLQR/MPC in gym cart-pole-v1 environment.Use A star to solve puzzle or maze.
6. Implement Q learning, policy gradient with linear function approximation.

Projects:

To be decided