

All topics and dates are tentative and subject to change. Any substantive changes (such as due dates) will be announced on Piazza.

Week	Date	High-level topic	Specific topics	Quizzes	Project checkpoints	Assignments	
1	Mon, Aug 23	1. Introduction to artificial intelligence	a. Overview of AI	Prereq Quiz (ungraded)			
1	Wed, Aug 25		b. Research in AI	Prereq Quiz (ungraded)			
1	Fri, Aug 27		c. Selecting research papers, PCA motivation, intuition	Prereq Quiz (ungraded)			
2	Mon, Aug 30	2. Principal components analysis (PCA)	a. Brief review of linear algebra				
2	Wed, Sep 01		b. NumPy and Matplotlib libraries	Quiz 1			
2	Fri, Sep 03		c. PCA formulation and different algorithms		<i>Suggested but optional: Select 3 papers</i>	Assignment 1	
3	Mon, Sep 06	3. Machine learning basics	<i>Labor day</i>				
3	Wed, Sep 08		a. KNN classification and regression	Quiz 2			
3	Fri, Sep 10		b. Scikit learn library			Assignment 2	
4	Mon, Sep 13	4. Basics of deep learning	c. Evaluation - Cross validation or held-out test set				
4	Wed, Sep 15		d. Linear and logistic regression	Quiz 3			
4	Fri, Sep 17		e. Gradient descent and loss functions		Draft of review of 3 papers		
5	Mon, Sep 20	4. Basics of deep learning	a. Fully connected NN and activation functions				
5	Wed, Sep 22		b. PyTorch deep learning framework	Review Quiz 4			
5	Fri, Sep 24		c. Convolutional networks		<i>Peer reviews due</i>	Assignment 3	
6	Mon, Sep 27	5. Clustering	d. Other common layers: residual, batch norm.				
6	Wed, Sep 29		e. (continued)	Quiz 5			
6	Fri, Oct 01		a. Clustering loss function, K-means clustering			Assignment 4	
7	Mon, Oct 04	6. Review of probability	c. Spectral clustering (another use of SVD)				
7	Wed, Oct 06		a. Review of probability and random variables	Quiz 6			
7	Fri, Oct 08		a. Review of probability and random variables				
8	Mon, Oct 11	6. Density estimation	<i>October break</i>				
8	Wed, Oct 13		a. KL divergence and maximum likelihood (MLE)	Quiz 7			
8	Fri, Oct 15		b. Gaussian and non-parametric density estimators		Initial implementation and writeup of results		
9	Mon, Oct 18	7. Non-linear dimensionality reduction	c. Gaussian Mixture Models and EM				
9	Wed, Oct 20		a. Autoencoder, Denoising / Sparse / Probabilistic	Review Quiz 8			
9	Fri, Oct 22		b. Variational Autoencoder (VAE)		<i>Peer reviews due</i>	Assignment 5	
10	Mon, Oct 25	8. Generative Adversarial Networks (GAN)	a. Original GAN and theory				
10	Wed, Oct 27		a. (continued)	Quiz 9			
10	Fri, Oct 29		b. Deep Convolutional GAN (DCGAN)				
11	Mon, Nov 01	9. Normalizing Flows	b. (continued)				
11	Wed, Nov 03		c. Other GAN-based models	Quiz 10			
11	Fri, Nov 05		c. (continued)			Assignment 6	
12	Mon, Nov 08	10. Special topics (time allowing)	a. Flow concept and invertible models				
12	Wed, Nov 10		b. Image flows - RealNVP / GLOW	Quiz 11			
12	Fri, Nov 12		c. Continuous normalizing flows / iterative flows				
13	Mon, Nov 15	10. Special topics (time allowing)	c. (continued)				
13	Wed, Nov 17		a. TBD	Quiz 12			
13	Fri, Nov 19		b. TBD		Term paper due		
14	Mon, Nov 22		c. Special topic - Word2vec		Implementation and video due		
14	Wed, Nov 24		<i>Thanksgiving</i>				
14	Fri, Nov 26		<i>Thanksgiving</i>				
15	Mon, Nov 29		Presentations				
15	Wed, Dec 01		Presentations	Review Quiz 13			
15	Fri, Dec 03		Presentations			Assignment 7	
16	Mon, Dec 06		Presentations				
16	Wed, Dec 08		Presentations				
16	Fri, Dec 10		Presentations		<i>Final peer reviews due</i>	Assignment 8	
17	Mon, Dec 13		No final exam				
17	Wed, Dec 15		No final exam				
17	Fri, Dec 17		No final exam				