Machine Learning KSAs for Curriculum Alignment

	2. Machine Learning Models & Algorithms					
	KSA Description	**Knowledge, Skill, or Ability?**	**Bloom's Taxonomy Level?**	**Cross-cutting KSAs**	**Course Number/Name**	**Learning Outcome**
a	Define key terms of machine learning, including natural language processing.	Knowledge	1			
b	Explain the difference between classification and regression problems.	Knowledge	2			
c	Explain the difference between clustering and association problems.	Knowledge	2			
d	Explain the difference between supervised and unsupervised machine learning, including the limitations of each.	Knowledge	2			
e	Explain at least three key supervised learning methods. For example, linear/logistic regression, decision trees, random forest, boosted trees, support vector machines, and neural networks.	Knowledge	2			
f	Explain major deep learning architectures (e.g., multilayer perceptron, feed forward network, CNN, RNN, LSTM, etc.) and when each is best applied.	Knowledge	2			
g	Explain key unsupervised learning methods, including k-means clustering, hierarchical clustering, association rules, and principal components analysis.	Knowledge	2			
h	Identify and recognize the clusters of common machine learning applications and limitations.	Knowledge	2			
i	Identify and recognize use cases to common machine learning applications.	Knowledge	2			
j	Understand the prerequisites and success criteria for machine learning.	Knowledge	2			
k	Explain the differences between basic learning algorithms and their applications.	Knowledge	2			
l	Explain the role and importance of model validation and accuracy metrics in analytics projects, hypothesis testing, and information retrieval.	Knowledge	2			
m	Explain efforts to make comples machine learning algorithms more explainable, such as Shapley values and/or LIME.	Knowledge	2			
n	Identify pros and cons of different machine learning algorithms.	Knowledge	2			
o	Implement, train, and validate a neural network.	Skill	3			