



Applied Machine Learning (Fall 2018, APSC 691)

Schedule

Tuesday and Thursday 12:30PM to 1:50PM *ISC 1111*

Instructor

Dr. **Dan** Runfola

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ISC 1269

Office Hours: Tuesday and Thursday 11:00AM to 12:30PM

757.221.1970

Please let me know if you have any documented disabilities that may impact your performance in this class.

Course Description: This course will focus on the technical application of machine learning algorithms, their nature, and discussions regarding the potential drawbacks and advantages of different classes of algorithms. Students entering into this course should have, at a minimum, a background in python and linear algebra. No single algorithm will be covered in great depth, and the course will place a focus on the code and implementation choices necessary for each class of algorithm. Topics covered will include data processing, regression in ML, decision trees, forests, k-nn, support vector machines, kernel SVM, naive bayes, k-means and hierarchical clustering, association rules, natural language processing, neural networks, and dimensionality reduction strategies..

Prerequisite(s): None.

Credit Hours: 4

Materials:

A free SciClone account is needed in order to access the William and Mary High Performance Cluster (HPC). Registration can be started at <https://hpc.wm.edu/acctreq/> .

You must bring a laptop to class each day unless otherwise noted during lecture.

Grade Distribution:

Labs 1-2	2.5%
Labs 3-7	5.0%
Labs 8-9	10.0%
Lab 10	15.0%
Midterm	15.0%
Final Project	20.0%

Letter Grade Distribution:

>= 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	<= 59.99	F

Attendance: This class does not have an attendance policy. However, it will be difficult to learn enough to pass the class without regular participation, as the majority of course content relevant to tests and assignments will be covered in class.

Classroom Behavior: Please remain civil during discussions to promote the open exchange of ideas and foster a culture of open dialogue. Please bear in mind that all students are entitled to their own opinion. You are expected to listen attentively to each person speaking. Please refrain from eating during class (and, if you must, make sure it isn't loud!).

Late / Poor Performance Policy: Assignments will not be accepted late, excepting in documented circumstances (i.e., an illness with a doctor's note).

Weekly Labs:

Every week you will be assigned a lab (excepting the two as noted on the schedule), and at the end of each week you must complete the lab assignment on Blackboard, which will generally consist of 10 questions. Labs are not accepted late. Each lab is available on Tuesday morning, and must be turned in by the following Monday at 11:59PM.

Midterm and Final: A written (online) midterm and final will test your knowledge of content presented during the course.

Important Dates: The add and drop deadline this semester is Sept 7, and withdrawal deadline is Oct 26.

Do not cheat!

Academic dishonesty is taken very seriously. Make sure to cite all of your work, and do not turn in work that is not yours! Cases of academic dishonesty will be evaluated and acted upon in accordance with William and Mary policies, which can be found at <http://www.wm.edu/offices/deanofstudents/services/student-conduct/>

Course Outline:

The course outline can be found below. The weekly content might change as it depends on the progress of the class.

TUESDAY		THURSDAY	
Aug 28th		30th	1
		Course Introduction	
Sep 4th	2	6th	3
Lecture: Data Processing I		Lecture: Data Processing II	
		Lab Time	
11th	4	13th	5
Lecture: OLS, ML and Polynomial Regression in Machine Learning I		Lecture: OLS, ML and Polynomial Regression in Machine Learning II	
18th	6	20th	7
Lecture: Support Vector Regression, Decisions Tree Regression and Forests I		Lecture: Support Vector Regression, Decisions Tree Regression and Forests II	
		Lab Time	
25th	8	27th	9
Lecture: Data Classification I		Lecture: Data Classification II	
		Lab Time	
Oct 2nd	10	4th	11
Lecture: Data Classification III		Lecture: Data Classification IV	
		Lab Time	
9th	12	11th	13
Lecture: Clustering, Midterm Introduction (no lab this week)		Midterm Review (Q&A Session)	
16th		18th	
Fall Break (No lab or office hours this week)		Midterm Work Time (No Class Meeting)	
23rd	14	25th	15
Lecture: Natural Language Processing (NLP) I		Lecture: Natural Language Processing (NLP) II	
		Lab Time	
30th	16	Nov 1st	17
Lecture: Association Rule Learning		Lecture: Reinforcement Learning	
		Lab Time	

TUESDAY		THURSDAY	
6th	18	8th	19
Lecture: Deep Learning (Artificial Neural Networks) I Deep Learning Lab I		Lecture: Deep Learning (Artificial Neural Networks) II Lab Time	
13th	20	15th	21
Lecture: Model Selection I		Lecture: Model Selection II Lab Time	
20th		22nd	
Catchup (No lab this week)		Thanksgiving	
27th	22	29th	23
Lecture: Dimensionality Reduction I		Lecture: Dimensionality Reduction II Lab Time	
Dec 4th	24	6th	25
Lecture: Morality, Big Data, and the End of the World Introduction of Final Exam		Q&A Review Session for Final	