

# Introduction to Machine Learning

## Spring 2019

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**Course Website:** Canvas & GitHub  
**Lecture:** Tuesday & Thursday at 1:55-3:50pm in Larsen Hall, Rm 310

**Course Description:** This course will cover introductory topics in pattern recognition and machine learning and use of these methods towards a variety of applications. The focus of this course is to be introduced to basic machine learning concepts and how to use machine learning tools (namely, scikit-learn and PyTorch ) towards a variety of applications. The following is an approximate schedule of the course:

- **Weeks 1-3: Introduction to Machine Learning and Evaluation of Methods:**
  - *Python and Numpy Tutorial*
  - *What is Machine Learning?*
  - *Error and Accuracy Metrics*
  - *Machine Learning Terminology*
- **Weeks 4-6: Introduction to Supervised Classification:**
  - *K-Nearest Neighbors, Decision Trees and SVM via scikit-learn*
  - *Decision Trees via scikit-learn*
  - *Experimental Design and Hyperparameter Tuning Strategies*
- **Weeks 7-9, Introduction to Neural Networks:**
  - *The Perceptron and Brief history of Neural Networks*
  - *Multi-layer Perceptron*
  - *Introduction to Pytorch*
- **Mid-Term Exam: During Week 9**
- **Weeks 10-12: Introduction to Deep Learning :**
  - *Deep Learning Fundamentals and Applications*
  - *Introduction to Convolutional Neural Networks: Applications and Implementation in Pytorch*
- **Weeks 13-15: Project Teams:**
  - *Completion of Project: In Class Project Focus*
  - *Project Presentations*

### Required Textbooks:

1. S. Raschka, "Python Machine Learning," Packt Publishing, 2015. ISBN: 978-1-78355-513-0
2. E Stevens and L. Antiga, "Deep Learning with Pytorch," Manning, 2018. ISBN: 978-1-61729-526-3

**Laptop Requirement:** A laptop with Python 3.4.3 or later, Pytorch and Git installed will be required during class for in class assignments. Please see: <https://www.eng.ufl.edu/students/resources/computer-requirements/>

**Prerequisites:** Programming Experience. We will be programming in Python.

**Evaluation and Grading:**

Mid-Term Exam	20% of grade
Project	20% of grade
In Class and Homework Assignments	60% of grade (with one assignment drop)

Each homework and in class assignment will be weighted equally. **Late Assignments will not be accepted.** If you feel a graded assignment or exam needs to be re-graded, you must discuss this with the instructor within one week of grades being posted for that assignment/exam. After one week, items will not be considered for re-grading. The class will be graded on a curve.

**Assignment Requirements:** Requirements for all assignments in this class are listed below. For maximum credit, along with correct, substantial answers, I expect high quality professional looking code and documents. Complete your assignments with care and ensure that your submission illustrates that you understand the concepts the assignment is trying to emphasize.

- For all assignments that require submission of code, turn in clean, easy to read, easy to run, and well commented Python 3.4.3+ code. Points will be taken off if code cannot be run and/or easily understood. For example, do not use one letter variable names, do not include “magic” numbers/parameters in your code that are unexplained, etc.
- Complete all assignments in the format assigned. For example, if a PDF document is requested and a Word DOC is submitted instead, you will lose points.
- Most assignments will be assigned (and will need to be submitted) via GitHub. Each assignment will have its own subfolder that will be pushed to your homework repositories. You should keep all files associated with an assignment within its subfolder. Be sure to pay attention and follow any required file naming convention for all assignments.

**Attendance Requirements:** As this course will have in class assignments, consistent attendance is very important. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

**Academic Dishonesty:** UF students are bound by The Honor Pledge which states, We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: On my honor, I have neither given nor received unauthorized aid in doing this assignment. The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor.

**Any student found to have cheated or plagiarized on an exam or assignment will be given a grade of 0 for that exam or assignment and the evidence will be sent to the Provost’s Office for the determination of any additional disciplinary action.** Unless an assignment is specifically structured as a group project, duplicate assignments written in collaboration with others is not acceptable. Although it is permissible to discuss the homework with others, these discussions should be of a general nature. All work at a detailed level must be done on your own. Students submitting the same or similar solutions to the homework will be considered as having cheated. No statements or actions made by anyone can alter this policy. Please review what constitutes plagiarism: <https://guides.uflib.ufl.edu/copyright/plagiarism>

**Accommodations:** Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**Online Course Evaluation:** Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.