Cover Sheet: Request 14112

EEE3XXX- Introduction to Machine Learning

Info

Process	Course|New|Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Shannon Chillingworth schill@ece.ufl.edu
Created	8/8/2019 2:17:04 PM
Updated	11/18/2019 8:15:54 AM
Description of request	New course request.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	ENG - Electrical and Computer Engineering 011905000	Robert Fox		8/14/2019
No document changes					
College	Recycled	ENG - College of Engineering	Heidi Dublin	Tabled. Issues with request/syllabus. ABET 3 & 4 outcomes/4 credits	9/5/2019
No document changes					
Department	Approved	ENG - Electrical and Computer Engineering 011905000	Robert Fox	Syllabus updated to address committee concerns	10/9/2019
No document changes					
College	Approved	ENG - College of Engineering	Heidi Dublin	Approved by the HWCOE Curriculum Committee and Faculty Council	11/18/2019
EEE3XXX_Intro_ML_UCC_1_Syll.docx					10/28/2019
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			11/18/2019
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Course|New for request 14112

Info

Request: EEE3XXX- Introduction to Machine Learning
Description of request: New course request.
Submitter: Shannon Chillingworth schill@ece.ufl.edu
Created: 10/28/2019 2:05:17 PM
Form version: 3

Responses

Recommended Prefix EEE
Course Level 3
Course Number XXX
Category of Instruction Intermediate
Lab Code None
Course Title Introduction to Machine Learning
Transcript Title Intro Machine Learn
Degree Type Baccalaureate

Delivery Method(s) On-Campus
Co-Listing No

Effective Term Earliest Available
Effective Year Earliest Available
Rotating Topic? No
Repeatable Credit? No

Amount of Credit 4

S/U Only? No
Contact Type Regularly Scheduled
Weekly Contact Hours 4
Course Description Covers introductory topics in pattern recognition and machine learning and use of these methods towards a variety of real world applications. The focus of this course is to be introduced to basic machine learning concepts and how to use associated state-of-the-art machine learning tools.
Prerequisites EEL3135
Co-requisites N/A
Rationale and Placement in Curriculum This course provides students with an introduction to topics in pattern recognition and machine learning and use of these methods towards a variety of real world applications. After completing this course, students will be able to take advanced machine learning courses.
Course Objectives Course Objectives
Understand and use the concepts of machine learning for data science. Focus on tools for application of deep learning and multivariate data analysis to real world data and problems.

These objectives will be accomplished through:
1. Semester-long group project that involves implementing a deep learning system
2. Discussion of pattern recognition and machine learning methods
3. Implementation of a variety of machine learning methods in code

Course Textbook(s) and/or Other Assigned Reading Required Textbooks and Software
- Title: Python Machine Learning
- Author: S. Raschka
- ISBN number: 978-1-78355-513-0
- Title: Deep learning with Pytorch
- Author: Eli Stevens and Luca Antiga
- ISBN number: 978-1-61729-526-3

- Software: Python 3+, Git, Pytorch

Weekly Schedule of Topics Course Schedule
- Weeks 1-3: Introduction to Machine Learning and Evaluation of Methods: What is Machine Learning? Error and Accuracy Metrics, Machine Learning Terminology, Introduction to Git (Assignment 1-3 due)
- Weeks 4-6: Introduction to Supervised Classification: K-Nearest Neighbors, Decision Trees, Random Forests, and Linear Classifiers; Experimental Design and Hyperparameter Tuning Strategies ?(Assignments 4-6 due)
- Weeks 7-9, Introduction to Neural Networks: The Perceptron and Brief history of Neural Networks; Multi-layer Perceptron; Introduction to Pytorch ?(Assignments 7-8 due)
- 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 (Assignment 10 due)
- Weeks 13-15: Project Teams:?Completion of Project: In Class Project Focus, Project Presentations?(Project due)

Grading Scheme Assignment Percentage of Final Grade

Assignments	40%
Midterm Exam	20%
Semester-long Project	20%
Final Exam	20%
TOTAL	100%

Instructor(s) Alina Glenn Zare
Attendance & Make-up Yes
Accomodations Yes
UF Grading Policies for assigning Grade Points Yes
Course Evaluation Policy Yes

Introduction to Machine Learning

Course Number: 3XXX
Class Periods: T 4, R 4-5
Location: Lar 310
Academic Term: Spring 2019

Instructor

- Name: Alina Zare
- Email Address: azare@ufl.edu
- Office Phone Number: 352-273-2604
- Office Hours: TBD

Teaching Assistants

- TBD

Course Description

4 credits. Covers introductory topics in pattern recognition and machine learning and use of these methods towards a variety of real world applications. The focus of this course is to be introduced to basic machine learning concepts and how to use associated state-of-the-art machine learning tools. Topics covered include: deep learning, linear and non-linear classifiers

Course Pre-Requisites / Co-Requisites

EEL 3135

Course Objectives

Understand and use the concepts of machine learning for data science. Focus on tools for application of deep learning and multivariate data analysis to real world data and problems.

These objectives will be accomplished through:
1. Semester-long group project that involves implementing a deep learning system
2. Discussion of pattern recognition and machine learning methods
3. Implementation of a variety of machine learning methods in code in assignments and lab activities

Professional Component (ABET)

This course consists of 1.5 credits of Engineering Design and 1.5 credits of Engineering Science

Relation to Program Outcomes (ABET)

Outcome	Coverage*
1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.	High
2. An ability to apply both analysis and synthesis in the engineering design process, resulting in designs that meet desired needs.	High
3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	High
4. An ability to communicate effectively with a range of audiences	
5. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must	

consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
6. An ability to recognize the ongoing need for additional knowledge and locate, evaluate, integrate, and apply this knowledge appropriately.	
7. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty	

Required Textbooks and Software

- Title: Python Machine Learning
- Author: S. Raschka
- ISBN number: 978-1-78355-513-0
- Title: Deep learning with Pytorch
- Author: Eli Stevens and Luca Antiga
- ISBN number: 978-1-61729-526-3

- Software: Python 3+, Git, Pytorch

Course Schedule

- Weeks 1-3: Introduction to Machine Learning and Evaluation of Methods: What is Machine Learning? Error and Accuracy Metrics, Machine Learning Terminology, Introduction to Git (Assignment 1-2 due, Lab Assignment 1)

- Weeks 4-6: Introduction to Supervised Classification: K-Nearest Neighbors, Decision Trees, Random Forests, and Linear Classifiers; Experimental Design and Hyperparameter Tuning Strategies (Assignments 4-5 due, Lab Assignment 2)

- Weeks 7-9, Introduction to Neural Networks: The Perceptron and Brief history of Neural Networks; Multi-layer Perceptron; Introduction to Pytorch (Assignments 7-8 due, Lab Assignment 3)

- 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 (Assignment 10 due, Lab Assignment 4)

- Weeks 13-15: Project Teams: Completion of Project: In Class Project Focus, Project Presentations (Project due)

Attendance Policy, Class Expectations, and Make-Up Policy

While attendance is not graded, lectures will include regular homework help and in-class discussions and in-class lab assignments.

Excused absences are consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

Evaluation of Grades:

Assignment	Percentage of Final Grade
Assignments	40%
Lab Assignments and Semester-long Project	20%
Midterm Exam	20%
Final Exam	20%
TOTAL	100%

Lab and Project Assignments:

- Lab 1 (2.5%): The objective of Lab 1 is to introduce students to the experimental design process for machine learning. Students will develop a project proposal that includes identification of a data set with discussion as to whether the data is easily available, the amount of data available, whether ground truth is available or can be generated. The proposal will also discuss a set of appropriate error metrics for the proposed project, methods for cross-validation and blind test set generation appropriate for the proposed problem, a set of experiments to be conducted and the proposed experimental design.

- Lab 2 (2.5%): The objective of Lab 2 is to introduce the students to the importance of pre-processing, normalization, feature extraction and feature selection. Students will develop, implement and compare several pre-processing pipelines on their approved project data sets. Students will also implement feature visualization scripts and cluster validity-type metrics to aid in their pre-processing evaluation and visualization.

- Lab 3 (2.5%): The objective in Lab 3 is to compile an initial end-to-end machine learning pipeline for provided data sets that include pre-processing, classification and evaluation on their approved project data sets. Students will compare classifiers implemented and provide discussion as to why some out-perform others given the properties of their data set and the classifiers used.

- Lab 4 (2.5%): The objective of Lab 4 is to finalize their choice of pre-processing pipeline and classifier selection, provide discussion and motivation for their chosen approach based on outcomes from Labs 1-3 and any additional experiments required

- Final Project (10%): In their final project, students will carry out their full experimental design, run and evaluate their performance on a hold-out blind test set, and provide extensive comparisons and discussions to alternative approaches.

Grading Policy:

Percent	Grade	Grade Points
93.0 - 100	A	4.00
90.0 – 92.9	A-	3.67
87.0 – 89.9	B+	3.33
83.0 – 86.9	B	3.00
80.0 – 82.9	B-	2.67
77.0 – 79.9	C+	2.33
73.0 – 76.9	C	2.00

70.0 – 72.9	C-	1.67
67.0 – 69.9	D+	1.33
63.0 – 66.9	D	1.00
60.0 – 62.9	D-	0.67
0 – 59.9	E	0.00

A "C-" will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: A "C-" average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement.

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Students Requiring Accommodations
Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://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.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

University Honesty Policy
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 (https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-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 or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual

violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:

Health and Wellness

U Matter, We Care:
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints*:* http://www.distance.ufl.edu/student-complaint-process.