PE SULEYMAN DEMIREL UNIVERSITY
2018- 2019 ACADEMIC YEAR

FACULTY OF ENGINEERING AND NATURAL SCIENCES
COMPUTER SYSTEMS AND SOFTWARE DEPARTMENT

«Approved by»

Dean of the Faculty
PhD, Assoc. Prof. Zhaparov M.

SYLLABUS

1. Course information

Course Code: CSS 324	**Course Title :** Introduction to Machine Learning		
Level : Undergraduate	**Year :** III	**Term:** Fall	**ECTS Credits :** 5
Status: Compulsory	**Hours per Week :** 2 Lectures + 1 Practice Session		**Total Hours :** 45.
Form of Education : Day		**Language of Instruction :** English	
Course Instructor : Nazerke Sultanova			
Office no. : F306	**Tel (int.) :** 432		**Email :** nazerke.sultanova@sdu.edu.kz
Time and place of consultation: During office hours in the instructor's office (F306) or by appointment			
Time and place of lessons: Please follow up the schedule of the classes			

2. Short description of the course

The objectives of the course "Introduction to Machine Learning" is to introduce students to state-of-the-art methods and modern programming tools for data analysis.

3a. Pre-requisites

Including the list of topics that student must know to understand the course

No	Course Code (if known)	Course Title / Topics to Know (if instructor is not sure whether relevant topics are have been covered in particular courses)
1	CSS 103	Algorithms and Programming (Python)
2	MAT 153	Calculus I

3b. Post-requisites

No	Course Code (if known)	Course Title / Topics to Know (if instructor is not sure whether relevant topics are have been covered in particular courses)
1	CSS 325	Advanced Machine Learning
		Deep Learning, Natural Language Processing, Computer Vision

4. Course Objectives (or Learning Outcomes)

At the end of the course, students are able to

- understand complexity of Machine Learning algorithms and their limitations;
- understand modern notions in data analysis oriented computing;
- be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;
- be capable of performing distributed computations;
- be capable of performing experiments in Machine Learning using real-world data.

5. Curriculum Plan (or Course Content or Weekly Distribution of Themes):

WEEK	DETAILED TOPICS	ASSIGNMENTS
1	Introduction to Machine Learning	Installing Anaconda. Data Visualization
2	Linear Regression. Accuracy/Error	
3	Logistic Regression. Regularization	
4	Naive Bayes. Conditional Probability	
5	SVM, k-nearest neighbours, scikit-learn	
6	Data Preprocessing, Decision Trees	
7	Midterm I	
8	Clustering, k-means	
9	Dimensionality Reduction. Optimization and Evaluation	
10	Text Sentiment Analysis	
11	Recommender Systems	
12	Ensemble Models	
13	Anomaly Detection	
14	Midterm II	
15	Neural Networks	

**Tabulated information about lectures, seminars, practice classes, lab studies, self study topics as well as topics of assignment with their deadline weeks and other requirements might be written within the optional column on the curriculum plan.*

6. Recommended Resources

6a. Main Textbook(s):

1. **Thomas' Calculus: Multivariable by** George B. Thomas
2. PythonML - Sebastian Raschka
3. Coursera: Machine Learning by Andrew Ng

6b. Supplemental Resources:

7. Grading Policy (or Assessment Criteria)

7a. Instructors assessment criteria:

Lab Assignments - 20%

Midterm1 - 20%

Midterm 2 - 20%

Final Exam - 20%

Final Project - 20%

8. Other Policies

Attendance:

Lecture attendance is strongly recommended. You may well be able to study and learn this material on your own, but we think you'll find this course a lot easier and less time-consuming if you attend class. You will not be able to pass this course if you miss more than 25% of attendance.

Class Policies:

Exams are closed book, and closed notes. No "Cheat sheets" are allowed. Exams will be during regular class periods. Midterm and Final Exams will be announced, however, in-class quizzes may be unexpected. Attendance at all exams is required. Unjustified failure to appear for an exam will earn a grade of zero on that exam. Justifications for not attending an exam include serious illness, medical and/or family emergencies, and conflicts with assembly exams in higher-numbered courses. Such justifications MUST be made, in advance, in writing to the course coordinator. In case of an illness, a doctor's note explaining the nature of the condition, the dates involved, and the expected time of recovery, is required. A doctor's note that does not contain ALL these elements will not be accepted. Students cannot claim they've been too ill to do their schoolwork, but not ill enough to go see a doctor or the infirmary. Failure to notify the course coordinator in advance will result in a grade of zero on the exam. Only the most dire (and documented) circumstances can excuse a student from the requirement of advance notification. Justification for not attending an exam does NOT include family reunions, vacations, or attendance at weddings, no matter the location of the event, or how long it has been planned. For justified exam absences, makeups will be arranged on a case-by-case basis. During the exam, you are only allowed to talk to Instructor or exam proctors. Talking to anyone else is considered academic dishonesty.