ATENEO DE MANILA UNIVERSITY

SYLLABUS FOR UNDERGRADUATE COURSES

A. COURSE INFORMATION

COURSE NUMBER	CSCI 214			**NO. OF UNITS**	3
COURSE TITLE	Pattern Recognition				
PREREQUISITE/S	CSCI 21 (or any basic programming course) Any basic statistics course Any basic college level algebra course				
DEPARTMENT/ PROGRAM	DISCS			**SCHOOL**	SOSE
SCHOOL YEAR	2024-2025			**SEMESTER**	1st
INSTRUCTOR/S	Raphael Alampay, PhD				
VENUE	F-227	**SECTION**	F/ZZZ	**SCHEDULE**	M-Th 15:30 - 17:00

B. COURSE DESCRIPTION

Pattern recognition is a course that focuses on the analysis and application of classical and state of the art machine learning algorithms. The first half of the course tackles fundamentals such as representation of data and the three general approaches to pattern recognition namely supervised, semi-supervised and unsupervised learning. In conjunction, students will also understand the use of tools and technologies to solve machine learning problems. Classical algorithms from simple regressions to statistical models will be discussed. In the second half, the discussion will then move to more advanced deep learning methods such as neural network based architectures and models. Students are expected to perform analytical input to empirical results for ideally publishable material by the end of the course.

C. PROGRAM LEARNING OUTCOMES

PROGRAM LEARNING OUTCOMES
PLO1: Perform independent, structured, multidisciplinary, and ethical research that is fact-based, verifiable, and publishable
PLO2: Recognize, interpret, and apply advanced concepts in Computer Science and ICT
PLO3: Initiate collaboration with domestic and/or international research teams
PLO4: Recognize socially-relevant problems that could be addressed via ICT, while keeping ethical implications in mind
PLO5: Design and devise effective solutions to unstructured, real-world problems via computational- and/or ICT-based approaches

Alignment of the Course to the Program Learning Outcomes

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	✔	✔			
CLO2	✔	✔			
CLO3	✔	✔			
CLO4		✔			
CLO5		✔			
CLO6		✔			
CLO7	✔	✔	✔	✔	✔

D. COURSE LEARNING OUTCOMES

By the end of this course, students should be able to:

COURSE LEARNING OUTCOMES
CLO 1: Understand pattern recognition in the context of data driven analysis.
CLO 2: Understand different machine learning problems and its categorization.
CLO 3: Understand different models and how it applies to the categorization of problems.
CLO 4: Analyze a given problem to properly represent features useful to modeling.
CLO 5: Apply models to given data in order to solve various problems.
CLO 6: Understand the difference between machine learning and deep learning.
CLO 7: Apply deep learning and machine learning techniques and assess its performance on various problems.

E. COURSE OUTLINE and LEARNING HOURS

Course Outline	CLOs	Estimated Contact or Learning Hours
Software and Tools	CLO1	5
Fundamentals of Data Representation	CLO1, CLO2, CLO3	10
Classical Supervised and Semi-supervised Algorithms	CLO2, CLO3	10
Classical Unsupervised Algorithms	CLO2, CLO3	10

Analyzing Results	CLO2, CLO3	10
Optimization Techniques	CLO3, CLO4	10
Feature Reduction Techniques	CLO3, CLO4	10
Visualization Techniques	CLO3, CLO4	5
Methods for Deep Learning	CLO6, CLO 7	10

ASSESSMENTS AND RUBRICS

Assessment Tasks	Assessment Weight	CLOs
Case Studies / Long Exam (3)	35%	All
Research Paper Updates	25%	All
Final Project	40%	All

RUBRICS:
Rubrics will be included in the assessment tasks' specifications.

F. TEACHING and LEARNING METHODS

TEACHING & LEARNING METHODS & ACTIVITIES	CLOs
Slides / Notes / Videos	All
Synchronous and Asynchronous Online Sessions	All
Case Study Discussion	All
Consultation	All

G. REQUIRED READINGS

- Theobald, Oliver. Machine Learning for Absolute Beginners. Packt Publishing, 2020.
- Conway, Drew, and John Myles White. Machine Learning for Hackers. O'Reilly Media, 2020.
- Manning Publications Co. Deep Learning for Coders. Manning Publications Co., 2021.
- Raschka, Sebastian. Machine Learning for Text and Natural Language Processing. Packt Publishing, 2021.
- Hofmann, Thomas. Multimodal Machine Learning. MIT Press, 2022.

H. SUGGESTED READINGS

TBA

I. GRADING SYSTEM

93 – 100 A Excellent

87 – 92.99 A- Very Good

81 – 86.99 B+ Good

75 – 80.99 B Satisfactory

69 – 74.99 C Unsatisfactory

(This grade does not entitle students to any graduate credit for the course)

Below 69 F Failure

(This grade does not entitle students to any graduate credit for the course)

J. CLASS POLICIES

1. Academic Integrity. DISCS Policy on Academic Integrity applies to this course. With each submission, students must include a certification (Certificate of Authorship) that their work is substantially their own and not copied from others. In addition, students must clearly acknowledge and specify any help from outside sources such as other classmates, the Web, books, etc., that they received while doing their projects / assignments. Students are expected to be familiar with the policies described here: Undergraduate Academic Policies, First Semester SY 2023-2024

2. Onsite Sessions. Face to face sessions will be conducted in the classroom specified in this document for at least 66% of the entire duration of the course. Classes will be announced to be onsite or online at the latest 24 hours prior to class time. By default, it is assumed that classes will be conducted onsite.

3. Online Synchronous Sessions. Students are encouraged to participate in the online synchronous for at most half of the entire semester during the duration of the course. If in any case this is not possible, kindly let the instructor know beforehand via email (see contact details below).

   a. Regular Sync Sessions: Monday / Thursday 3:30 pm - 5 pm (links will be made available in Canvas)

   b. Official Sync Session Platform: Zoom

   c. Asynchronous by default. Being a 3 hour class, it is possible that the sync session will not cover the entire 3 hours. The remaining hours will be dedicated to asynchronous sessions which will be established during the synchronous session.

4. Learning Management System. The official LMS for the course is Ateneo Canvas (). All materials, activities, announcements and submissions will be managed using this platform. During the first day, check if you are able to login using the credentials provided by Ateneo. Feel free to reach out for any technical problems.

5. Submission Format. For submission of files, if submitted via Canvas, make sure to zip it using the format [submission-id]-[id-number].zip. If via git, a link will suffice.

6. INC grades. A grade of INC will only be issued for truly exceptional cases subject to assessment.

7. Please make sure that for every engagement we do within or outside our class, we do it with respect to the individual. Discrimination on any basis will not be tolerated. See the following link for more information on the LS Gender Policy and Code of Decorum and Administrative Rules on Sexual Harassment, Other Forms of Sexual Misconduct, and Inappropriate Behavior.

8. Use of Large Language Models (i.e. ChatGPT / BARD etc) is allowed and encouraged provided that the student discloses its usage and is able to provide empirical evidence that such content with regards to argumentative clauses on usage of AI models or any other related content exists on at least an academic level.

K. CONSULTATION HOURS

NAME OF FACULTY	EMAIL	DAY/S	TIME
Raphael Alampay, PhD	ralampay@ateneo.edu	M-F	5pm onwards or by appointment
Paolo Dano	pdano@ateneo.edu	M-W	4-5pm