

University of Puerto Rico
 Mayagüez Campus
 College of Engineering
 Department of Electrical and Computer Engineering
 Bachelor of Science in Electrical Engineering

Course Syllabus

1. General Information:	
Alpha-numeric codification: INEL 5046 Course Title: Pattern Recognition Number of credits: 3 Contact Period: 3 hours of lecture per week. Electives in INEL and ICOM	
2. Course Description:	
English: An introduction to the field of Pattern Recognition: statistical decision making, non-parametric decision making, clustering, artificial neural networks, learning techniques, evaluation of classification rules and applications. Spanish: Una introducción al área de reconocimiento de patrones, incluyendo evaluación de decisiones estadísticas, evaluación de decisiones no-paramétricas, redes neuronales, técnicas de aprendizaje, evaluación de reglas de clasificación y aplicaciones.	
3. Pre/Co-requisites and other requirements:	
ININ 4010	
4. Course Objectives:	
After completing the course, the student should be able to: classify data using parametric, non-parametric and neural network methods, cluster data, design pattern recognition based algorithms to analyze data.	
5. Instructional Strategies:	
<input checked="" type="checkbox"/> conference <input type="checkbox"/> discussion <input type="checkbox"/> computation <input type="checkbox"/> laboratory <input type="checkbox"/> seminar with formal presentation <input type="checkbox"/> seminar without formal presentation <input type="checkbox"/> workshop <input type="checkbox"/> art workshop <input type="checkbox"/> practice <input type="checkbox"/> trip <input type="checkbox"/> thesis <input type="checkbox"/> special problems <input type="checkbox"/> tutoring <input type="checkbox"/> research <input type="checkbox"/> other, please specify:	
6. Minimum or Required Resources Available:	
Materials, equipment, and physical facilities needed to fulfill the course objectives.	
7. Course time frame and thematic outline	
Outline	Contact Hours
Introduction	2
Probability Review	2
Bayesian Decision Theory	6
Parameter Estimation	4
Non-Parametric Decision Making	5
Linear Discriminant Functions	4
Artificial Neural Networks	6
Unsupervised Learning and Clustering	5
Applications	5
Advanced Topics	5
Exams	1
Total hours: (equivalent to contact period)	45
8. Grading System	
<input checked="" type="checkbox"/> Quantifiable (letters) <input type="checkbox"/> Not Quantifiable	

9. Evaluation Strategies (Suggested): The faculty member teaching the course will provide the student with the evaluation strategy he/she will be using throughout the semester. This will be done within the first week of classes.

	Quantity	Percent
<input checked="" type="checkbox"/> Exams	1	25
<input checked="" type="checkbox"/> Final Exam	1	25
<input checked="" type="checkbox"/> Short Quizzes	varies	10
<input checked="" type="checkbox"/> Oral Reports	1	5
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input checked="" type="checkbox"/> Projects	1	25
<input type="checkbox"/> Journals		
<input checked="" type="checkbox"/> Other, specify: Homework	varies	10
TOTAL:		100%

10. Bibliography:

Richard O. Duda, Peter E. Hart and David G. Stork, Pattern Classification, John Wiley and Sons, 2nd edition, 2001.
 Earl Gose, Richard Jonhsonbaugh and Steve Jost, Pattern Recognition and Image Analysis, Prentice Hall, 1996.
 S. Theodoridis and K. Koutroumbas, Pattern Recognition, 3rd edition, Academic Press, 2006.
 L. Devroye, L. Gyorfı and G. Lugosi, A probabilistic theory of pattern recognition, Springer-Verlag, 1996.

11. According to Law 51

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Chemistry Building, room 019) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

12. Contribution of Course to meeting the requirements of Criterion 5:

Math	Basic Science	General	Engineering Topic
			√

13. Course Outcomes

Map to Program Outcomes

- Apply statistical techniques to compute decision bounaries (a)
- Apply histogram and kernel estimates to interpret data (b)
- Apply feature reduction methods (a)
- Apply similarity metrics and criterias to cluster data (k)
- Develop a classification system for given data (e)
- Train neural networks with different learning rules (a)
- Apply neural network to solve a classification problem (k)
- Perform literature survey on a pattern recognition topic (i)
- Perform the analysis of a pattern recognition system (g)
- Evaluate the performance of classifier systems on data (k)

Person (s) who prepared this description and date of preparation: Vidya Manian and Miguel Figueroa. Submitted by: Miguel Vélez, Julio 07