

**Faculty of Computers & Information Technology**

**Pattern Recognition**

**Information :**

**Course Code :** DM351

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Digital Media Technology

**Area Of Study :**

- Define knowledge that enhances skills in fundamental area of pattern recognition
- Use and adopt fundamental and advanced mathematics, basic sciences and computer science theories in all development phases of pattern recognition.
- Solve problems using mathematical knowledge through analyzing and interpreting data.
- Comprehend deeply the basic concepts of pattern recognition to be ready for further and continuous learning

**Description :**

Introduction; Probability theory: Bayes' rule; Parameter estimation; Statistical decision making: discriminate functions; measures of classification performance and measures of classification risk; Non-parametric decision making: Adaptive discriminate functions; Minimum squared error discriminate functions; Clustering techniques: Hierarchical clustering, Partitioning clustering; Artificial neural networks Hopfield nets- Other PR systems: Syntactic pattern recognition; Hidden Markov Model based; Application examples.

**Course outcomes :**

**a.Knowledge and Understanding: :**

1 -	Define the fundamental mathematics and statistics required to solve problems in pattern recognition area
2 -	Explain what constitutes pattern recognition system and how to address issues related to design of each system components.
3 -	Explain the principles and techniques of pattern recognition

**b.Intellectual Skills: :**

1 -	Illustrate a set of alternative solutions for a given pattern recognition problems associated with their results.
2 -	Select appropriate methodologies and techniques for a given pattern recognition problem solution and setting out their limitations, restrictions and errors.
3 -	Classify methods, techniques and algorithms used in pattern recognition problems solutions

**c.Professional and Practical Skills: :**

1 -	Deploy effective supporting tools to implement pattern recognition systems.
2 -	Apply effective information to learn pattern recognition programming languages.
3 -	Use human computer interaction principles in the construction and evaluation of user interfaces for wide ranges of pattern recognition applications

**d.General and Transferable Skills: :**

1 -	Work in a team to develop the requirement documentation
-----	---

2 - Apply communication skills in presentations and report writing using various methods and tools.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to pattern recognition	4	2	2
Feature Extraction	4	2	2
Bayesian methods	4	2	2
Feature transformation	4	2	2
Feature transformation	4	2	2
Supervised classification	4	2	2
Supervised classification	4	2	2
Linear classifiers	4	2	2
Mid Term Exam	2		
Non-Linear classifiers	4	2	2
Principle Component Analysis	4	2	2
Clustering methods	4	2	2
Project presentation	4	2	2
Final Exam	2		

**Teaching And Learning Methodologies :**

Interactive Lectures including discussion
Practical Lab Sessions
Self-Study (Project / Reading Materials / Online Material / Presentations)
Case Studies

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Final Exam	40.00	14	
Midterm Exam (s)	20.00	9	
Others (Participation)	10.00		
Practical Exam	10.00		
Quizzes	10.00	5	
Team Work Projects	10.00		

**Course Notes :**

Course Notes are available with all the slides used in lectures in electronic form on Learning Management System (Moodle)

**Recommended books :**

Duda and Hart, "Pattern Classification ", Wiley, latest edition

**Web Sites :**

- IEEE transactions on Pattern Recognition
- IEEE pattern analysis and machine intelligence
- [www.ai.com](http://www.ai.com)