Course Name: Pattern Recognition
Course Code: IT342

I. Basic Course Information

Major or minor element of program: Both Major Minor
Department offering the course: Information Technology Department

Academic level: 300 Level
Semester in which course is offered: Second (spring) Semester
Course pre-requisite(s):

Credit Hours: 3
Contact Hours Through:

Lecture	Tutorial*	Practical*	Total
2.5	0.0	1.5	4.0

* 1.5 hours for **either** Tutorial or Practical

Approval date of course specification: January 2015

II. Overall Aims of Course

Familiarize the student with the most popular pattern recognition techniques and their applications.

III. Program ILOs covered by course

Program Intended Learning Outcomes (By Code)			
Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
K1,K10,K17	I12,I15,I18	P3,P12,P13	G2,G5,G6

IV. Intended Learning Outcomes of Course (ILOs)

a. Knowledge and Understanding

On completing the course, students should be able to:

K.1 Recognize what constitutes a pattern recognition (PR) system and how to address issues related to design of each system components.
K.2 Definethe range of applications of PR systems.
K.3 Listthe state-of-art of PR techniques.
K.4 Definethe major clustering methods.

b. Intellectual/Cognitive Skills

On completing the course, students should be able to:

I.1 Analyse and test PR techniques with problem at hand.
I.2 Propose solutions and their expected results.
I.3 Construct and evaluate an existing PR system.

c. Practical/Professional Skills

On completing the course, students should be able to:

P.1 Use PR tools.
P.2 Modify PR system.
P.3 Demonstrate PR problem.

d. General and Transferable Skills

On completing the course, students should be able to:

G.1 Improve presentation skills.
G.2 Improve team working skills.
G.3 Improve working ethics through evaluating individual efforts and strictly prohibiting plagiarism.
G.4 Learn to follow design requirements through requiring precise understanding of written questions.

V. Course MatrixContents

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILO Code)			
			K & U	I.S.	P.S.	G.S.
1-	Introduction to PR	1	All		P3	
2-	Feature extraction	2	K1,K2,K3	All	P1,P3	All
3-	Bayesian methods	2	K1,K2,K3	All	All	All
4-	Feature transformation	2	K1,K2,K3	All	P1,P3	All
5-	Supervised classification	2	K1,K2,K3	All	P3	G4
6-	Linear classifiers	1	K1,K2,K3	All	All	
7-	Non-linear classifiers	1	K1,K2,K3	All	All	
8-	Principal Component Analysis (PCA)	1	K1,K2,K3	All	P1,P3	
9-	Clustering Methods	1	All	All	All	
	Net Teaching Weeks	**13**				

VI. Course Weekly Detailed Topics / hours / ILOs

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours*
1	Moments and Freeman Chain Code	2.5	2.5	
2	Minimum Distance Classifier and Bayes Classifier	4	2.5	1.5
3	Feature Transformations	4	2.5	1.5
4	Classification and Perceptron Learning Algorithm	4	2.5	1.5
5	Minimum Sum Squared Error Classifier (MSE)	4	2.5	1.5
6	Neural Networks	4	2.5	1.5
7	**Midterm Exam**			
8	Principal component Analysis (PCA)	4	2.5	1.5
9	Clustering Methods	4	2.5	1.5
10	Adaptive Clustering	4	2.5	1.5
11	Bachelor Clustering	4	2.5	1.5
12	K-Means Algorithm	4	2.5	1.5
13	Hidden Markov Models	4	2.5	1.5
14	Revision	4	2.5	1.5
15	**Final Exam**			
Total Teaching Hours		**51**	**33**	**18**

* **No Practical/Tutorial during the first week of the semester**

VII. Teaching and Learning Methods

Teaching/Learning Method	Selected Method	Course ILOs Covered by Method (By ILO Code)			
		K & U	Intellectual Skills	Professional Skills	General Skills
Lectures & Seminars	/	All	All	All	All
Tutorials					
Computer lab Sessions	/	All	All	All	All
Practical lab Work	/	All	All	All	All
Reading Materials		All		All	All
Web-site Searches					
Research & Reporting					
Problem Solving / Problem-based Learning		All	All	All	All
Projects					
Independent Work					
Group Work		All	All	All	All
Case Studies					
Presentations					
Simulation Analysis					
Others (Specify):					

VIII. Assessment Methods, Schedule and Grade Distribution

Assessment Method	Selected Method	Course ILOs Covered by Method (By ILO Code)				Assessment Weight / Percentage	Week No.
		K & U	I.S.	P.S.	G.S.		
Midterm Exam	[ ]	[All]	[All]	[ ]	[ ]	[20%]	7
Final Exam	[ ]	[All]	[All]	[ ]	[ ]	60%	15
Quizzes	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Course Work	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Report Writing	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Case Study Analysis	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Oral Presentations	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Practical	[ ]	[All]	[ ]	[All]	[All]	[20%]	[Every Week
Group Project	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Individual Project	[ ]	[All]	[All]	[All]	[All]	[10%]	[10]
Others (Specify):	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

IX. List of References

Essential Text Books	• [Sergios Theodoridis, KonstantinosKoutroumbas,"Pattern recognition",third edition, 2006,ELSEVIER.]
Course notes	• [Handouts to the students part by part]
Recommended books	• [Duda and Hart,"Patternclassifictaion "]
Periodicals, Web sites, etc …	• [None]

X. Facilities required for teaching and learning

[List the facilities required
- Board
- Computer labs
- Matlab software]

Course coordinator: Prof.KhaledMostafa

Head of Department: [Prof. Hesham El Mahdy]

Date: [January 2015]