



Course Specification

Course Name: [Data Mining]
Course Code: [IS421]

I. Basic Course Information

Major or minor element of program: [Major]
Department offering the course: [Information Systems Department]

Academic level: [400 Level]
Semester in which course is offered: [First (fall) Semester]
Course pre-requisite(s): [Database 2 [IS312]]

Credit Hours: 3
Contact Hours Through:

Lecture	Tutorial *	Practical *	Total
2.5	0	1.5	4.0

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

Approval date of course specification: September 2014

II. Overall Aims of Course

<p>[The aims of this course are to:</p> <ul style="list-style-type: none">• Expand on the student's understanding and awareness of the concept of data mining basics, techniques, and applications.• Introduce the basic concepts of 'Data Pre-processing & Summary Statistics'.• Introduce the concepts of 'Frequent Item set Generation, Associations and Correlations measures'.• Introduce the concepts of 'Classification, Prediction, and Clustering Algorithms'.• Build on the programming and problem solving skills developed in previous subjects studied by the student, to achieve an understanding of the development of Classification, Prediction, and Clustering applications.]
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III. Program ILOs covered by course

Program Intended Learning Outcomes (By Code)			
Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
[K13,K17,K22]	[I7,I15,I18,I19]	[P10,P11,P13,P18]	[G2,G5,G9]



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IV. Intended Learning Outcomes of Course (ILOs)

a. Knowledge and Understanding

On completing the course, students should be able to:

- K.1 Explain the basic concepts of Data Mining.
- K.2 Illustrate the concept of Data Pre-processing & Summary Statistics.
- K.3 Know and understand the concepts and techniques of Frequent Item set Generation, Associations and Correlations measures.
- K.4 Know and understand the concepts and techniques of Classification, Prediction, and Clustering Algorithms.
- K.5 Know applications of data mining in real life.]

b. Intellectual/Cognitive Skills

On completing the course, students should be able to:

- I.1 Learn how to use Statistical measures.
- I.2 Learn how to apply the Graphic Displays of Data Summaries.
- I.3 Handle data quality problems Noisy and outliers Data, and missing values.
- I.4 Learn how to apply Data Transformation and Reduction.
- I.5 Measure data similarity and dissimilarity.
- I.6 Mine Frequent Patterns, Associations, and Correlations.]

c. Practical/Professional Skills

On completing the course, students should be able to:

- P.1 Predict useful information from given data.
- P.2 Use data mining techniques in real data mining life applications.
- P.3 Find the impact of data analysis techniques in decision making process.
- P.4 Implement different Classification/Prediction/Clustering techniques.]

d. General and Transferable Skills

On completing the course, students should be able to:

- G.1 Work effectively as individuals or as a part of a team to apply skills gained throughout the course to design and implement different data mining techniques.
- G.2 Apply problem solving capabilities.
- G.3 Know the role of data mining in real life applications.
- G.4 Know the importance of data analysis in decision support systems and applications.]

V. Course Matrix Contents

	Main Topics / Chapters	Duration (Weeks)	Course ILOs Covered by Topic (By ILO Code)			
			K & U	I.S.	P.S.	G.S.
1-	Introduction to Data Mining & Basic concepts]	[2]	[K1]	[]	[]	[]
2-	Data Pre-processing]	[1]	[K2]	[I1,I2,I3,I4,I5]	[]	[]
3-	Summary Statistics]	[1]	[K2]	[I1,I2,I3,I4,I5]	[]	[]
4-	Mining Frequent Patterns, Associations, and Correlations]	[2]	[K3,K5]	[I6]	[P1,P2,P3]	[All]
5-	Classification]	[4]	[K4,K5]	[]	[All]	[All]
6-	Prediction]	[1]	[K4,K5]	[]	[All]	[All]
7-	Clustering]	[1]	[K4,K5]	[]	[All]	[All]
	Net Teaching Weeks	13				



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VI. Course Weekly Detailed Topics / hours / ILOs

Week No.	Sub-Topics	Total Hours	Contact Hours	
			Theoretical Hours	Practical Hours *
1	[Introduction to Data Mining & Basic Concepts]	[2.5]	[2.5]	
2	[Introduction to Data Mining & Basic Concepts]	[4]	[2.5]	[1.5]
3	[Data Pre-processing]	[4]	[2.5]	[1.5]
4	[Summary Statistics]	[4]	[2.5]	[1.5]
5	[Mining Frequent Patterns, Associations, and Correlations: Association Rules & Frequent Item set Generation]	[4]	[2.5]	[1.5]
6	[Mining Frequent Patterns, Associations and Correlations :Correlation Measures]	[4]	[2.5]	[1.5]
7	Midterm Exam			
8	[Classification: Decision Tree Induction]	[4]	[2.5]	[1.5]
9	[Classification : Bayesian Classification]	[4]	[2.5]	[1.5]
10	[Classification: Rule-Based Classification]	[4]	[2.5]	[1.5]
11	[Classification: Artificial Neural Networks & Lazy Learners]	[4]	[2.5]	[1.5]
12	[Prediction : Linear Regression]	[4]	[2.5]	[1.5]
13	[Clustering: Distance measures & K-means clustering]	[4]	[2.5]	[1.5]
14	[Review]	[4]	[2.5]	[1.5]
15	Final Exam			
Total Teaching Hours		51	33	18

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



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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	<input checked="" type="checkbox"/>	All	All	P1 ,P2	
Tutorials	<input type="checkbox"/>				
Computer lab Sessions	<input checked="" type="checkbox"/>		All	P4	
Practical lab Work	<input checked="" type="checkbox"/>		I6	P1 , P4	All
Reading Materials	<input checked="" type="checkbox"/>	All	All	P1 , P2 , P3	
Web-site Searches	<input type="checkbox"/>				
Research & Reporting	<input type="checkbox"/>				
Problem Solving / Problem-based Learning	<input type="checkbox"/>				
Projects	<input type="checkbox"/>				
Independent Work	<input checked="" type="checkbox"/>			All	All
Group Work	<input checked="" type="checkbox"/>				G1
Case Studies	<input type="checkbox"/>				
Presentations	<input type="checkbox"/>				
Simulation Analysis	<input type="checkbox"/>				
Others (Specify):	<input type="checkbox"/>				

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	<input checked="" type="checkbox"/>	All	All			15%	7
Final Exam	<input checked="" type="checkbox"/>	All	All			60%	15
Quizzes	<input type="checkbox"/>						
Course Work	<input checked="" type="checkbox"/>		All			10%	3,5,8,10
Report Writing	<input type="checkbox"/>						
Case Study Analysis	<input type="checkbox"/>						
Oral Presentations	<input type="checkbox"/>						
Practical	<input checked="" type="checkbox"/>			All	All	15%	4,6,9,11
Group Project	<input type="checkbox"/>						
Individual Project	<input type="checkbox"/>						
Others (Specify):	<input type="checkbox"/>						



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IX. List of References

Essential Text Books	<ul style="list-style-type: none">• [Data Mining: Concepts and Techniques 2nd Edition (Jiawei Han & Micheline Kamber)]
Course notes	<ul style="list-style-type: none">• [available on book's site: http://www.faculty.cs.uiuc.edu/~hanj/bk2/]
Recommended books	<ul style="list-style-type: none">• [Introduction to Data Mining by Pang-Ning Tan, Michael Steinbach, Vipin Kumar.]
Periodicals, Web sites, etc ...	<ul style="list-style-type: none">• [ACM digital Library: http://portal.acm.org/dl.cfm?coll=portal&dl=ACM&CFID=21491530&CFTOKEN=49241968• IEEE computer society: http://www.computer.org/portal/site/ieeecs/index.jsp]

X. Facilities required for teaching and learning

<p>[List the facilities required</p> <ul style="list-style-type: none">• Software package for data mining]

Course coordinator: [Dr. Osama Ismael]

Head of Department: [Ass. Prof. Ehab Ezzat]

Date: [September 2014]