Course Specifications

General Information

Course name	Data Mining
Course number	ITCS4346
Faculty	
Department	
Course type	Major Needs
Course level	4
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - The concepts, principles and theory of data-mining
2 - The role of data mining within IT dependent enterprises
3 - The relationships among data mining, data warehousing and Online Analytical Processing
4 - The core paradigms of data mining: association rule, clustering, classification and prediction
5 - The ability to use, compare and select appropriate data-mining tools
6 - Data mining algorithms and techniques
7 - Practical experience of data-mining on a variety of datasets
8 - Pursue research in Data Mining

Intended Learning Outcomes

Knowledge and Understanding	* a1 Define the concepts, techniques and algorithms of the data-mining * a2 Discuss the principles and techniques of a number of application areas informed by the research directions of data mining * a3 Identify some aspects of the OLAP and Decision support systems * a4 Interpreting and analyzing data qualitatively and/or quantitatively * a5 Discuss a working application using a commercial data mining/data warehousing software tool * a6 Identify tools, practices and methodologies used in the specification, design, implementation and critical evaluation of information and computer systems * a7 Outline research fields across a range of knowledge areas
Intellectual Skills	* b1 Assess raw input data to provide suitable input for a range of data mining algorithms * b2 Critically evaluate and select appropriate data-mining algorithms * b3 Perform comparisons between (methods, techniques...etc) * b4 Identify attributes, components, relationships, patterns, main ideas, and errors * b5 Summarize the proposed solutions ad their results * b6 Restrict solution methodologies upon their results * b7 Establish criteria, and verify solutions * b8 Identify a range of solutions and critically evaluate and justify proposed design solutions
Professional Skills	* c1 Design and implementation of a data mining application * c2 Solve data mining problems with pressing commercial or industrial constraints * c3 Perform problem analysis from written descriptions; derive requirements specifications from an understanding of problems (analysis, synthesis) * c4 Apply the principles of effective data management, information organization, and information-retrieval skills to data mining * c5 Identify any risks or safety aspects that may be involved in the operation of computing equipment within a given context * c6 Deploy effectively the tools used for the construction and documentation of software
General Skill	* d1 Collaborate effectively within team * d2 Work in stressful environment and within constraints * d3 Manage tasks and resources * d4 Acquire entrepreneurial skills * d5 Communicate effectively by oral, written and visual means * d6 Develop a range of fundamental research skills, through the use of online resources, technical repositories and library-based material

Course Contents

1 - Introduction
2 - Data
3 - Exploring Data
4 - Classification: Basic Concepts, Decision Trees, and Model Evaluation
5 - Classification: Alternative Techniques
6 - Association Analysis: Basic Concepts and Algorithms
7 - Cluster Analysis: Basic Concepts and Algorithms

Teaching and Learning Methods

1 - Lectures
2 - Tutorial Exercises
3 - Practical Exercises

Students Assessment

Assessment Method	TIME	MARKS
Midterm Exam	8th week	20
Assignments		10
Presenation	14th week	20
Final Exam	16th week	50

Books and References

Essential books	Pang-Ning Tan, Michael Steinbach, and Vipin Kumar. Introduction to Data Mining, 1st Edition, Addison-Wesley, 2006

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
Introduction	1	a1	b1	c1,c2,c3	d1,d2,d3
Data	2-3	a1, a2, a3, a4	b1, b2	c2, c3	d1-d5
Exploring Data	4-6	a1, a2, a3, a4	b1, b2	c2, c3	d1-d5
Classification: Basic Concepts, Decision Trees, and Model Evaluation	7-9	a3, a4	b3, b4, b5	c4, c5	d1-d5
Classification: Alternative Techniques	10-11	a5	b6,b7,b8	c6	d1-d5
Association Analysis: Basic Concepts and Algorithms	12-13	a1, a2, a3, a4	b1, b2	c2, c3	d1-d5
Cluster Analysis: Basic Concepts and Algorithms	14-15	a5-a7	b6-b8	c6	d1-d6