Course Name: Data Mining   **Course Code: ITEC415**

General Information						
Course Code	**ITEC 415**	**Level/Year**	7th/4rd	**Required (R) / Selected Elective (SE)**		R
Credit Hours	**Theory**	2	**Lab**	1	**Total**	3
Prerequisites	**ITEC313**	**Course Coordinator**		Dr. Jayabrabu Ramakrishnan		
Corequisites	NIL	**Track Leader**		Dr. John Martin		

Course Description
This course covers an introduction to data mining methods and theoretical knowledge on developing data analysis and data warehouses using data mining concepts. It also discusses data quality measure methods and various techniques for data pre-processing. The course also covers the modelling and design of data warehouses and mining algorithms like classification, clustering, outliers and association techniques. During the lab session, practice tool like Python is used for data analysis.

Course Objectives: On completion of the course, the student will be able to:
• Describe the basic concepts of Data mining and Data warehouse techniques. • Understand and implement the classical models and algorithms in data warehouses and data mining. • Characterize the kinds of patterns that can be discovered by association rule mining, classification and Clustering. • Develop skills in selecting the appropriate data mining algorithm for solving practical problems. • Apply data mining techniques for various applications like social, scientific and environmental contexts.

Course Contents	

List of Topics	Weeks
Chapter 1: Introduction to **Data Mining**, An Essential Step in Knowledge Discovery, Diversity of Data Types for Data Mining, Mining Various Kinds of Knowledge, Confluence of Multiple Disciplines, Data Mining and Applications, Data Mining and Society, Summary.	1,2
Chapter 2: Data Types, Statics of Data, Similarity and Distance Measures, Data Quality, Data Cleaning and Data Integration, Data Transformation, Dimensionality Reduction, Summary.	3,4,5
Chapter 3: Data Warehouse: Basic Concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation, Summary.	6,7
Chapter 4: Basic Concepts in Pattern Mining, Frequent Itemset Mining Methods, Pattern Evaluation Methods, FP – Growth Algorithm Summary.	8,9,10
Chapter 5: Classification: Basic Concepts of classification, supervised and unsupervised, types of classification techniques, Decision Tree Induction, Model Evaluation and Selection, Techniques to Improve Classification Accuracy, Summary.	11,12,13
Chapter 6: Cluster Analysis: Basic Concepts, K-means, Different approached of Clustering, Partitioning Methods, Evaluation of Clustering, Hierarchical Clustering, Summary.	14,15

Textbook

- Data Mining Concepts and Techniques, Jiawei Han, Jian Pei and Hanghang Tong, Publisher: Katey Birtcher, 4th Edition, 2023, *ISBN: 978-0-12-811760-6*.

Reference Materials

- Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, Jian Pei, Morgan Kaufmann Publishers, 3rd Edition, 2012, ISBN978-0-12-381479-1.
- Data Warehousing in the Real World; Sam Anahory & Dennis Murray; 1997, Pearson, ISBN 0201175193.

Course Learning Outcomes

CLO	Description	Mapped PI
CLO#01	Students will **define** the fundamental concepts in data mining, including data preparation, pattern recognition, and knowledge representation.	PI 1.1
CLO#02	Students will **understand** preprocessing skills like data cleaning, transformation, and preparation for analysis.	PI 1.3
CLO#03	Students will be able to **identify** and **apply** various data mining techniques such as clustering, classification, and association rule mining to derive insights from complex datasets.	PI 1.4
CLO#04	Students will **gain** hands-on experience using popular data mining tools.	PI 3.1
CLO#05	Ability to **evaluate** and select the most effective tools for given project requirements.	PI 2.4 & PI 2.3
CLO#06	Students will effectively **communicate** the findings from the data mining project evaluation through reports, presentations and demonstrations.	PI 3.2

CLO-PI-SO Mapping

	SO-1	SO-2	SO-3	SO-4	SO-5	SO-6
CLO#01	PI 1.1	-	-	-	-	-
CLO#02	PI 1.3	-	-	-	-	-
CLO#03	PI 1.4	-	-	-	-	-
CLO#04	-	-	PI 3.1	-	-	-
CLO#05	-	PI 2.3 PI 2.4	PI 3.1 PI 3.3	-	-	-
CLO#06	-	-	PI 3.2	-	-	-