INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

PREDICTIVE DATA ANALYTICS

VII Semester: CSE (AI &ML)

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACAC17	Elective	3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes:45		

Prerequisite: There is no prerequisite to take this course

I. COURSE OVERVIEW:
Predictive data analytics is the art of building and using models that make predictions based on patterns extracted from historical data. Analytics is the process of transforming data into insight for making better decisions (INFORMS). There are three primary types of analytics: "Descriptive," which examines historical data and identifies and reports historical patterns and trends; "Predictive," which predicts outcomes and future trends from existing data to help discover new relationships; "Prescriptive," which formulates and evaluates new ways for a business to operate. This course focuses on the second type, Predictive Analytics, which is of particular importance for business because it helps decision makers evaluate possible.

II. COURSE OBJECTIVES:
The students will try to learn:

I. The fundamental concepts of data analytics.
II. The principles and methods of statistical analysis
III. The models used in predictive data analytics applications using supervised machine learning.
IV. The interesting patterns analyze supervised and unsupervised models and estimate the accuracy of the algorithms.

III. COURSE SYLLABUS:
MODULE – I: MACHINE LEARNING FOR PREDICTIVE DATA ANALYTICS (09)
Introduction to Predictive Data Analytics, Predictive Data Analytics project life cycle CRISP-DM, Predictive Data Analytics Tools, Data to insights to Decisions, Accessing Feasibility, Designing the Analytics Base Table and case study.

MODULE – II: DATA TO INSIGHTS TO DECISION (09)
Designing and Implementing Features, The Normal Distribution and Case Study, Handling Data Quality Issues, Identifying Data Quality issues, Advanced Data Exploration, Data Preparation, Case Study.

MODULE – III: INFORMATION BASED LEARNING (09)
Big Idea, Fundamentals, Decision Trees, Shannon Entropy Model, Information Gain, The ID3 Algorithm, Extensions and Variations.
Similarity Based Learning, Big Idea and Fundamentals, The Nearest Neighbor Algorithm with a Worked Example, Extensions and Variations.

MODULE – IV:PROBABILITY BASED LEARNING (09)
Fundamentals, Bayes Theorem, Bayesian Prediction, Conditional Independence and Factorization. The Naïve Bayes Model with an Example, Extensions and Variations, Continuous Features, Probability Density Function, Binning, Bayesian Networks

MODULE - V ERROR BASED LEARNING(09)
Fundamentals, Simple Linear regression, Measuring Error, Error Surfaces, Multivariable Linear Regression with Gradient Decent with an Example, Extensions and Variations.

IV. TEXT BOOKS:
1. John D. Kelleher, Brian Mac Namee, D'Arcy, "Fundamentals of Machine Learning for Predictive Data Analytics", The MIT Press Cambridge, Massachusetts London, England, 2015.

2. Finlay S, Palgrave," Predictive Analytics Data Mining and Big Data Myths Misconceptions and Methods", 2014.

V. REFERENCE BOOKS:

1. BarberD," Bayesian reasoning and machine learning", Cambridge University Press, 2012.
2. Bertin, J," Semiology of Graphics: Diagrams, Networks, Map", ESRI Press, 2010.
3. Bishop CM, "Neural Networks for Pattern Recognition", Oxford University Press, 1996.
4. Daelemans, W. and A. van den Bosch," Memory-based Language Processing". Studies in natural language processing", Cambridge University Press, 2005.

VI. WEB REFERENCES:

1. https://www.predictiveanalyticstoday.com/what-is-predictive-analytics/
2. https://www.educba.com/data-analytics-vs-predictive-analytics/
3. https://www.sisense.com/glossary/predictive-data-analytics/
4. https://www.omnisci.com/technical-glossary/predictive-analytics