

PRACTITIONERS' COURSE IN DESCRIPTIVE, PREDICTIVE AND PRESCRIPTIVE ANALYTICS

Multi Faculty

PREREQUISITES	: The student should have completed five semesters of UG Engineering or Science program.	TYPE OF COURSE	: Rerun Elective UG PG
INTENDED AUDIENCE	: Students of all Engineering and Science disciplines.	COURSE DURATION	: 8 weeks (23 Aug'21 - 15 Oct'21)
INDUSTRIES APPLICABLE TO	: Analytics companies – Mu Sigma, Cisco, EXL analytics, KPMG, Ernst & Young, etc.; Financial companies - CapitalOne, SBI Cap, ICICI, Amex, etc.; Banking sector – SBI, UBI, Reserve Bank, HDFC, HSBC, Canara Bank, Yes Bank, etc.		

COURSE OUTLINE

Data analytics is a demanding field and industry is looking for potential employees who are having a practitioners approach to data analytics. This course is aimed at providing exposure to various tools and techniques along with relevant exposure to appropriate problems so that the know-how and do-how aspect of analytics, which is required by industry can be fulfilled. The course also aims at introducing various applications with the involvement of real-life practitioners so that appropriate exposure to audience who intend to build a career in this area is possible.

ABOUT INSTRUCTOR

Prof. Deepu Philip is a faculty of Industrial & Management Engg. Department and Design Programme of IIT Kanpur. He works in the area of Production and Operations, Systems Simulation, Product Life Cycle Management, Unmanned Aerial Systems, and Systems Engineering. He holds bachelor degree in Industrial Engineering with his doctorate in Industrial & Management Engineering from MSU Bozeman. He has both academic and industrial experience with leading organizations of the world.

Prof. Amandeep Singh Oberoi is working as Assistant Professor in the Department of Industrial and Production Engineering Department, National Institute of Technology, Jalandhar, India. He holds PhD degree from Indian Institute of Technology Kanpur, India, and a bachelor degree in Production Engineering. Dr. Singh has over eight years of industrial and academic experience.

Mr. Sanjeev Newar is the CEO of 4Front Analytics and is a graduate from IIT Guwhati and IIM Calcutta. He works in the field of analytics, especially on financial and risk analytics.

COURSE PLAN

- Week 1** : Introduction to analytics; Differentiating descriptive, predictive, and prescriptive analytics, data mining vs data analytics
- Week 2** : Industrial problem solving process; Decision needs and analytics, stakeholders and analytics, SWOT analysis
- Week 3** : Model and modeling process, modeling pitfalls, good modelers, decision models and business expectations,
- Week 4** : Different types of models – overview of context diagrams, mathematical models, network models, control systems models, workflow models, capability models
- Week 5** : Data and its types, phases of data analysis, hypothesis and data Scales, relations, similarity and dissimilarity measures, sampling process, types of sampling, sampling strategies, error mitigation
- Week 6** : Visualization of numeric data, visualization of non-numeric data, tools available for visualizations
Hypothesis testing, pairwise comparisons, t-test, ANOVA, Wilcoxon signed-rank test, Kruskal-Wallis test, A/B testing
- Week 7** : Data infrastructure, analytics and BI, data sources, data warehouse, data stewardship, meta data management
Data and forecasting, super-forecasting, S-curve (lifecycle), moving average, exponential smoothing, error in forecasting Linear correlation, correlation and causality, spearman's rank correlation, Linear regression, logistic regression, robust regression
- Week 8** : Hierarchical clustering (Euclidean & Manhattan), k-means clustering, Nearest neighbor, decision trees
Basics, customer lifetime value, customer probability model, Net promoter score, survival analysis
Product lifecycle analysis, Ansoff's matrix, competitive map, Fundamentals of simulation, simulation types, Monte-Carlo simulation