


COMPUTER AIDED DECISION SYSTEMS - INDUSTRIAL PRACTICES USING BIG ANALYTICS

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PRE-REQUISITES : The student should have completed two semesters of UG Engineering or Science program.

INTENDED AUDIENCE : Students of all Engineering and Science disciplines.

INDUSTRY SUPPORT : TCS, Accenture, Tech Mahindra, Capgemini India Pvt Ltd., Genpact.

COURSE OUTLINE :

Industry 4.0 has marked the use of Computer Aided Decision Support Systems largely using Big Data Analytics in developing interfaces between the soft and physical systems. With huge numbers of sensors, smartphones, vehicles and systems being connected, the data and information is being generated at an unprecedented pace. Big Data Science has become a prominent tool to conceptually connect and realize fruitful use of this data and information. This has created tremendous opportunities and ventures for the students and practitioners. This course covers the major sectors that utilize the Big Data Analytics vis-à-vis Retail Industry, Engineering and Manufacturing, Healthcare, and Transportation. The predominant tools in the above sectors and use of soft tools are designed to make the course useful for the practitioners. The candidates are expected t take a new leap on taking the Analytics assignments after taking this course.

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. He has experience in designing and implementing complex system of systems in different fields including defense, aviation, fertilizer, strategic chemical plants, transportation, banking, automation, health care, energy, and communication. Prof. Amandeep Singh is working as Research Establishment Officer at Indian Institute of Technology, Kanpur, India. He holds PhD degree from Indian Institute of Technology Kanpur, India, and a bachelor degree in Production Engineering. Prof. Singh has seventeen years of industrial and academic experience. His research interests are Sustainable Manufacturing Processes and Systems, Simulation of Manufacturing Systems, Product Design and Manufacturing, Additive Manufacturing and Engineering Metrology. He has fetched grants and has holds projects from various national and international funding agencies such as DST, BIRAC, SIDBI. He has traveled in countries like US, Canada, and Australia to work on international assignments and present his research ideas. His research is also published in many international reputed journals.

COURSE PLAN :

Week 1: Introduction to Systems
System Analysis and Design
Decision Support Systems (DSS)
Design of Decision Support Systems

Week 2: Rational Decisions using DSS
Introduction to Relational Database
Relating Multiple Databases
Case Study on DSS
Assignment: Practice on DSS Databases

Week 3: Basics of Data Modelling
Models for DSS
Selecting a Right Model
Assignment: Practice on Model Selection
Developing Models for DSS applications

Week 4: Introduction to Big Data
General Applications and Uses
Big Data Analytics (BDA)
Assignment: Additional reading material
Case Study on Retail Industry

Week 5: Credit Modeling
Web Analytics
BDA in Engineering and Manufacturing
Assignment: Additional reading material
Enhancing Quality and Cost Control

Week 6: Improving Forecast Accuracy
Anticipating Demand Changes
Inventory Management
Pricing, Market Basket Analysis
Week 7: Cost Management
Medical Monitors, Targeted Drug Delivery
US BRAIN Initiative
Alzheimer's and Parkinson's models
Assignment: Case study on Healthcare BDA
Week 8: Population Health Strategies
BDA in transportation
ATC Management
Flat Tracking, Tyre & Fuel Usage
Assignment: Demonstration using soft tools
Week 9: Buying Power instead of engine (RR Model)
Assignment: Case study on Transportation BDA models
Complaint Redressal
UAVs, Smart Vehicle Integration
Big Data practices in Industry
Week 10: Introduction to Simulation
Discrete Event Simulation
Simulation for Descriptive Analytics
Simulation for Prescriptive Analytics
Week 11: Product Innovation, and Benchmarking
Real-Time Performance Monitoring (Mc Laren)
Assignment: Case study on Manufacturing
BDA and Industry 4.0
Product Lifecycle Management, Managing Innovation
Assignment: Demonstration on PLM software
Week 12: BDA and Healthcare
Reducing reaction time to critical clinical events
Back Testing Analytical Models
Recapitulating the CADSS BDA concept