ANALYTICS CENTER LEARNING PROGRAM

Overview of Curriculum

The following courses are offered by ***Analytics Center*** as part of its learning program:

Course	Duration	Prerequisites
1- Math and Theory		
101 - Fundamentals of Business Analytics	32 Hours	
102 - Data-driven Decision Making	32 Hours	
2- Software and Tools		
Data Engineering		
201 - Introductory Data Analysis with Spreadsheets and Databases	12 Hours	
202 - Management Information and Data Systems	24 Hours	
203 - Data Analytics with Python	24 Hours	101 - 202
204 - Data Analytics with R	24 Hours	101 - 202
205 - Data Analytics with SAS	24 Hours	101 - 202
206 - Data Analytics with IBM Modeler(SPSS)	24 Hours	101 - 202
Mastering Big Data		
211 - Introduction to High Performance (Big Data) Analytics	24 Hours	101 - 202
212 - Big Data Management with Apache Tools: Hadoop, Cassandra, Hbase, Hive, Drill, Pig)	30 Hours	211
213 - Big Data Analytics with Apache Spark & Mahout	24 Hours	212
3- Applications		
301 - Business Applications of Analytics	12 Hours	
302 - Customer Analytics	24 Hours	101
303 - Debt Collection and Customer Risk Analytics	24 Hours	101 - 102
304 - Operations Analytics for Retailers	24 Hours	101 - 102
305 - Digital/Web Analytics	24 Hours	101
4 - Strategy and Management		
401 - Big Data for Executives and Leaders	8 Hours	
402 - Management and Organization of Analytics Practices	12 Hours	301

In the curriculum, courses starting with code 1 are "Math and Theory" track courses and require undergraduate level of math and linear algebra. These courses are for everyone who needs to develop fundamental theoretical background in the field.

Courses starting with code 2 are "Software and Tools" track courses and involves programming and software tool usage which may require familiarity or background in programming and IT concepts depending on the course. Those courses are for profiles who are responsible for working with data, crunching numbers and responsible for hands-on data management, analysis and modeling. Typical

positions are analysts, modelers, data scientists, analytics consultants and leaders working in analytics or IT teams and departments.

The courses starting with code 3 are "Application" track courses and aims to present and describe business applications of analytics and targets practitioners with a level of business experience. Typical positions targeted are analysts, specialists, managers and executives of related departments.

The courses starting with code 4 are "Strategy and Management" track courses targeting executive professionals and leaders who are responsible for managing and organizing analytics projects, initiatives, functions, or organizations.

Course Descriptions

1 - Math and Theory Track

101 - Fundamentals of Business Analytics

The course covers main topics in the fields of analytics, statistics, data mining, machine learning and aims to build a theoretical and mathematical foundation. The following are some of the topics to be covered:

- Overview of linear algebra and statistical mathematics
- Concepts of business statistics and data mining
- Exploratory data analysis and data preparation
- Multivariate Statistical Methods
    - Analysis of Variance (ANOVA)
    - Discriminant analysis
    - Regression analysis
    - Structural equation modeling
    - Principal component and factor analysis
    - Multi dimensional Scaling
    - Conjoint and correspondence analysis
    - Design of experiments
    - Time series analysis and forecasting
- Data mining methods and algorithms
    - Descriptive methods: Clustering, association rules
    - Predictive methods: Decision trees, logistic regression, support vector machines, neural networks.
- Advanced modeling approaches
- Model performance evaluation and model maintenance.

102 - Data-driven Decision Making

The course covers topics from prescriptive analytics, operations research, system simulation and decision theory fields to provide a background on quantitative modeling. Main topics to be covered are:

- Mathematical programming and modeling
- Prescriptive analytics
- Decision systems
- Operations research and optimization
- Business and process simulation

2 - Tools and Software Track

Data Engineering

201 - Introductory Data Analysis with Spreadsheets and Databases

The course provides a basic training to develop skills for effective usage of spreadsheets and simple usage of database programs for quick data analysis.

- Working with spreadsheets (MS Excel)
- Working with databases (MS Access, MySQL etc.)

202 -Management Information and Data Systems

The course aims to provide an understanding of systems, components and functions of information and data systems used in practice and fundamental skills for efficiently using these systems. Some of the topics to be covered are:

- Information and data systems
  - Concepts of information and data
  - Relational databases and SQL
  - Data warehouses, OLAP
  - NOSQL systems
- Data handling
  - Accessing,
  - Querying,
  - Reporting
  - ETL processes
- Data quality and cleansing
- Data visualization

203 - Data Analytics with Python

This course aims to teach and develop skills for

- Manipulating, processing, cleaning and processing data
- Statistical and data mining modeling

with Python language, packages and libraries.

204 - Data Analytics with R

This course aims to teach and develop skills for

- Manipulating, processing, cleaning and processing data
- Statistical and data mining modeling

with Cran-R environment, language and packages.

205 - Data Analytics with SAS

This course aims to teach and develop skills for

- Manipulating, processing, cleaning and processing data
- Statistical and data mining modeling

with the SAS System.

206 - Data Analytics with IBM Modeler (SPSS)

This course aims to teach and develop skills for

- Manipulating, processing, cleaning and processing data
- Statistical and data mining modeling

with the IBM Modeler (SPSS) software.

Mastering Big Data

211 - High Performance Analytics (Big Data)

This course covers topics from high performance analytics and big data paradigms and aims to provide an hands-on introduction to emerging technologies in the field. Some of the topics to be covered are:

- Big data and high performance concepts
- Architectures, components and tools

    - NOSQL
    - Distributed File Systems and Map-reduce Algorithms
    - In-memory Databases and Systems
- Data storage, retrieval and processing in high performance systems
- Parallel algorithms
- Topics in high performance computing

212 - Big Data Management with Apache Software Foundation Tools

- Using Apache Hadoop and Pig : Distributed storage and programming for Big Data
- Apache Cassandra and Hbase: Distributed database management systems
- Apache Hive and Drill: Summarization, querying and analyzing Big Data

213 - Big Data Analytics

- Cluster computing and programming with Apache Spark and Pig
- Analytics and machine learning with Apache Mahout

3 - Business Applications Track

301 - Business Applications of Analytics

The purpose of the course is to provide an understanding and broad overview on how analytics can help businesses to increase revenue, cut costs, improve efficiency, support growth and improve customer value. The course presents case studies and describes analytics applications in various industries and business functions:

- Marketing & customer analytics
- Risk analytics
- Financial analytics
- Supply chain and operations analytics
- Demand and price forecasting
- Web analytics
- Text analytics

302 - Customer Analytics

This course provides and presents analytical applications and models in the functions of marketing, sales, service and customer management. Some of the topics to be covered are:

- Customer segmentation, profiling, and valuation.
- Churn/attrition modeling

- Propensity, cross-sell, up-sell and uplift modeling
- Marketing and campaign optimization
- Models of customer experience, customer journey and lifecycle
- Social network analysis

303 - Debt Collection an Customer Risk Analytics

This course provides and presents analytical applications and models used in the business functions of debt collection and risk analytics. Some of the topics to be covered are:

- Customer data enrichment
- Customer profiling
- Collection scoring
- Customer segmentation and treatment differentiation
- Treatment optimization

304 - Operations Analytics for Retailers

This course provides and presents analytical applications and models in the retail industry. Some of the topics to be covered are:

- Demand forecasting
- Inventory models
- Network and route optimization
- Pricing

305 - Digital/Web Analytics

This course provides and presents analytical applications and models in the digital/web businesses. Some of the topics to be covered are:

- Logfile, page tagging approaches
- Click data stream analysis
- Digital customer analytics
- Text analytics
- Recommendation systems

Strategy and Management Track

401- Big Data for Executives and Leaders

This course aims to provide an overview of Big Data applications, best practices and ideas on how Big Data paradigm can help executives to transform their businesses.

402 - Management and Organization of Analytics Practices and Initiatives

This course aims to provide background, tips and tricks on how to successfully define, organize, manage and monitor practices involving analytics content and teams. The course presents how to successfully formulate and design strategies, organize analytics teams and functions, deploy efficient processes for successful analytics practices in enterprises.