



## Bachelor of Science in Digital Science and Technology (DST)

### (2) Data Science

#### Course description of Major Elective Courses

Number of credits (Lecture – Laboratory – Self-study)

#### ITDS 341 Introduction to Data Science 3 (2 – 2 – 5)

Prerequisite: ITDS 251

Co-requisite: None

Fundamentals of data science methodologies for working with data in a variety of business, social sciences, and medical sciences domains; the integration of concepts and techniques across core disciplines of the data science, including databases, data warehousing, data mining, statistics, data visualization, high performance computing, cloud computing, business intelligence, data security and data privacy

#### ITDS 342 Advanced Mathematics and Statistics for Data Science 3 (3 – 0 – 6)

Prerequisite: ITDS 124 and ITDS 125

Co-requisite: None

A review of calculus; differentiation; integration; linear algebra; matrix algebra; vectors and matrices; geometry of matrices and derivatives: linear transformations and partial derivatives; descriptive statistics: data and data presentation, measures of location and variability; probability theory; probability distributions; sampling distributions; statistical significance; tests of hypothesis; analysis of variance; linear regression and correlation; algorithms for the data analysis: classification and clustering

#### ITDS 343 Business Data Analytics 3 (2 – 2 – 5)

Prerequisite: ITDS 251

Co-requisite: None

Extracting information from large data sets; analyzing and solving problems by modeling, simulation and optimization; identifying and utilizing appropriate algorithmic techniques to solve relevant business problems such as targeted advertising campaigns, the fraud identification, the loan prediction, and the inventory optimization; the insight information presentation using the data visualization and data storytelling methodologies to answer hypotheses and business questions in various domains; differences between exploratory and explanatory data visualization and various types of charts to visualize large scale data; creating dashboards using business intelligence tools such as Tableau or Power BI; communicating the insight information tailoring to a target audience, with a compelling narrative to finally translated into actions or business outcomes

**ITDS 344 Data Engineering and Infrastructure 3 (2 – 2 – 5)**

Prerequisite: ITDS 221 and ITDS231

Co-requisite: None

Fundamentals of the big data infrastructure for continuous data analytics; design, development, testing, and maintenance of big data architectures; distributed the database clustering system, and the large-scale data processing system; using big data technologies such as Mapreduce and Apache Spark to address big data problems

**ITDS 345 Business Intelligence 3 (2 – 2 – 5)**

Prerequisite: ITDS 221

Co-requisite: None

Concepts, components and architecture of the decision support and business intelligent systems; decision theories; decision models; the database administration for the decision support and business intelligent systems; the qualitative and quantitative model implementation; data warehouses and the knowledge management; the design and analysis of the business intelligent systems; software tools used to develop business intelligent systems; cases studies and business applications of the decision support systems; data integration from various sources; key performance indicator design; data extraction; data transformation; data visualization and dashboard design

**ITDS 346 Practical Data Science 3 (0 – 6 – 3)**

Prerequisite: ITDS 251

Co-requisite: None

Data science projects based on actual industrial problems, which requires approval from advisors; writing project reports; presenting data science projects