Data Informatics Department
A Guide to Data Science Related Courses offered by the Graduate School of Informatics
V1: 17/06/2022

This guide aims to give information regarding the prerequisites and the summary of the contents of some of the courses related to data science offered by the institute. Please check the syllabus of the courses from sis.metu.edu.tr to get more recent detailed information. The frequency information is to give you a rough idea about how frequent the corresponding course might be (or planned to be) offered. It is not an exact number. It might change in the following year.

Prerequisites	Necessity	Course/s	Notes	Frequency
-	No prerequisite	IS 503 Database Concepts and Applications	The course introduces entity relational (ER) models, ER to relational mapping, relational algebra, SQL, normalization and concurrency subjects. Students learn how to use relational database management systems.	Each semester
-	No prerequisite	IS 545 Object Oriented Programming and Data Structures	This course is designed as an entry level Python programming and data structures course for students who do not have prior programming experience.	Each semester
-	No prerequisite	DI 592 Mathematics for Data Informatics	This course reviews the fundamental mathematics knowledge required to carry out data informatics related studies such as logic, relations, functions, vectors and matrices, operations with vectors and matrices, linear independence, linear transformations, eigenvalues and eigenvectors, optimization.	Once in a year
-	No prerequisite	DI 591 Probability and Statistics for Data Informatics /BIN 502	This course provides students with the probability and statistics knowledge that are extensively used in the data informatics field.	Once in a year

IS 545 Object Oriented Programming and Data Structures	Essential	IS 509 Introduction to Data Science	DI501 and IS509 are equivalent courses. You should take only one of them. The main difference between them is IS509 includes topics such as probability, statistical tests, and regression topics but DI501 will not have these since they are taught in the deficiency courses of DI program. DI version includes topics such as neural networks, data storytelling, visualization and model optimization techniques.	Each semester
IS 503 Database Concepts and Applications		or		
DI 591 Probability and Statistics for Data Informatics /BIN 502	Preferred	DI 501 Introduction to Data Informatics		
DI 592 Mathematics for Data Informatics				
DI 501 Introduction to Data Informatics	Essential	IS 580 Knowledge, Discovery and Mining	This course includes advanced topics compared to IS509/DI501. It covers topics such as recommendation systems, ensembles, mixture of experts, data engineering pipelines, warehouses, association rules (not given in DI501). Hence, the prerequisite is IS509, DI501 or any other related machine learning course.	At least once in two years
IS 509 Introduction to Data Science				
IS 509/DI 501/MMI 702	Essential	DI 504 Foundations of Deep Learning or MMI 727 Deep Learning: Methods and Applications	DI504 Foundations of Deep Learning is equivalent to MMI727 Deep Learning and Applications. You should take only one of them. The main difference is that DI504 will cover information system topics in a broad sense with examples and applications such as time series, text, multimedia. MMI727 is specific to multimedia content.	Each semester
DI 504/MMI 727	Essential	IS784 Deep Learning for Text Analytics	This course covers advanced NLP models in deep learning domain such as word embeddings, transformers models, question answering etc. The course assumes that you have basic knowledge in deep learning.	Once in a year
-	No prerequisite	IS 585 Social Network Analysis	This course is intended to introduce to students how to extract information contained in a network to measure and characterize them, different types of networks, creating models of networks and predicting their behaviour. Most commonly used GUI-based software tools for	At least once in two years

			measuring and displaying network data will also be introduced. the course will also focus on specific applications of the network analysis in epidemiology, surveillance, marketing, healthcare, collective intelligence, spread of new ideas and social computing.	
DI 592 Mathematics for Data Informatics	Strongly recommended	IS 566 Image Processing Algorithms	Digital Signal Processing Fundamentals, Fourier Transform of Images, Image Enhancement, Edge Detection, Image Restoration, Morphological Image Processing, Image Segmentation, Representation and Description, Wavelets and Multiresolution Processing, Gabor Filters, Object Recognition. Students need to have a solid background in linear algebra before taking this course.	At least once in two years