

**POLIMI**  
DATA SCIENTISTS

PMDS STUDY PLAN BY ROLE

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## THE DOCUMENT

This document is intended as a *suggestion* for all the students enrolled in an MSc (Laurea Magistrale) at **Politecnico di Milano** willing to pursue a career in the Data Science field. The purpose of this document is to *provide guidance* based on the *personal experience* of alumni who attended the courses mentioned in the following study plans and on *external output* from professionals and online resources. The authors *do not aim to replace* in any way the study plans published on the official PoliMi website but to explore them further. As a suggestion, readers are in charge of *critically evaluate* what is written and act by their own will, especially regarding the constraints for the *INT1*, *TABA* and *TABB* courses. No course from the *DOT* tab has been added but they are strongly suggested. The authors hope to *increase the awareness* on which are the main roles in the Data Science industry and possibly how a student can choose among the subjects provided by **Politecnico di Milano** to direct his/her learning process towards one *role of interest*.



# DATA SCIENTIST

## SEMESTER 1

FOUNDATIONS OF OPERATIONS RESEARCH	M
FORMAL LANGUAGES AND COMPILERS	M
DATA BASES 2	M
SOFTWARE ENGINEERING 2	M
SOFT COMPUTING	E
COMPLESSITA NEI SISTEMI E NELLE RETI	E

## SEMESTER 2

ADVANCED COMPUTER ARCHITECTURES	M
COMPUTING INFRASTRUCTURES	M
COMPUTER SECURITY	M
MACHINE LEARNING	E
MODEL IDENTIFICATION AND DATA ANALYSIS 1	E
MODEL IDENTIFICATION AND DATA ANALYSIS 2	E

## Required Skills & Role

- Distributed Computing
- Predictive modeling
- Story-telling and visualizing
- Maths, Stats, Machine Learning

A *data scientist* cleans, massages and organizes (big) data.

### SEMESTER 3

UNSTRUCTURED AND STREAMING DATA ENGINEERING	E
DISTRIBUTED SYSTEMS	E
DATA MANAGEMENT FOR THE WEB	E
ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING	E
BAYESIAN STATISTICS	E

### SEMESTER 4

DATA INTELLIGENCE APPLICATIONS	E
DATA MINING AND TEXT MINING	E
THESIS	M



# DATA ARCHITECT/ENGINEER

## SEMESTER 1

FOUNDATIONS OF OPERATIONS RESEARCH	M
FORMAL LANGUAGES AND COMPILERS	M
DATA BASES 2	M
SOFTWARE ENGINEERING 2	M
SOFT COMPUTING	E
DATA MANAGEMENT FOR THE WEB	E

## SEMESTER 2

ADVANCED COMPUTER ARCHITECTURES	M
COMPUTING INFRASTRUCTURES	M
COMPUTER SECURITY	M
MACHINE LEARNING	E
MODEL IDENTIFICATION AND DATA ANALYSIS 1	E
MODEL IDENTIFICATION AND DATA ANALYSIS 2	E

## Required Skills & Role

- Database systems (SQL & NoSQL)
- Data modeling & ETL
- Data APIs
- Data Warehousing solutions

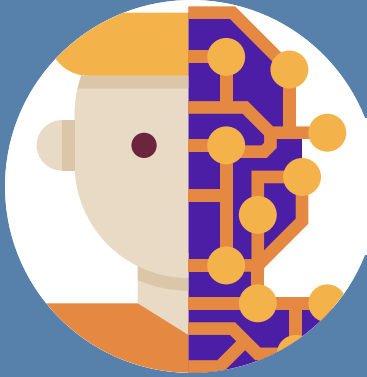
A **data architect/engineer** develops, constructs, tests and maintains architectures.

### SEMESTER 3

TECHNOLOGIES FOR INFORMATION SYSTEMS	E
UNSTRUCTURED AND STREAMING DATA ENGINEERING	E
ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING	E
FREE SLOT	E
FREE SLOT	E
FREE SLOT	E

### SEMESTER 4

DEPENDABLE SYSTEMS	E
DATA MINING AND TEXT MINING	E
THESIS	M



# MACHINE LEARNING ENGINEER

## SEMESTER 1

FOUNDATIONS OF OPERATIONS RESEARCH	M
FORMAL LANGUAGES AND COMPILERS	M
DATA BASES 2	M
SOFTWARE ENGINEERING 2	M
SOFT COMPUTING	E
ARTIFICIAL INTELLIGENCE	E

## SEMESTER 2

ADVANCED COMPUTER ARCHITECTURES	M
COMPUTING INFRASTRUCTURES	M
COMPUTER SECURITY	M
MACHINE LEARNING	E
MODEL IDENTIFICATION AND DATA ANALYSIS 1	E
MODEL IDENTIFICATION AND DATA ANALYSIS 2	E

## Required Skills & Role

- Database systems (SQL & NoSQL)
- Data modeling & ETL
- Advanced Coding proficiency
- Maths, Stats & Machine Learning

A *machine learning engineer* acts as the intermediary between data scientists and data engineers.

### SEMESTER 3

RECOMMENDER SYSTEMS	E
NATURAL LANGUAGE PROCESSING	E
ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING	E
BAYESIAN STATISTICS	E
FREE SLOT	E

### SEMESTER 4

DATA INTELLIGENCE APPLICATIONS	E
DATA MINING AND TEXT MINING	E
THESIS	M





# BUSINESS ANALYST

## SEMESTER 1

FOUNDATIONS OF OPERATIONS RESEARCH	M
FORMAL LANGUAGES AND COMPILERS	M
DATA BASES 2	M
SOFTWARE ENGINEERING 2	M
DATA MANAGEMENT FOR THE WEB	E
COMPLESSITA NEI SISTEMI E NELLE RETI	E

## SEMESTER 2

ADVANCED COMPUTER ARCHITECTURES	M
COMPUTING INFRASTRUCTURES	M
COMPUTER SECURITY	M
MACHINE LEARNING	E
BUSINESS INFORMATION SYSTEMS 1	E
BUSINESS INFORMATION SYSTEMS 2	E

## Required Skills & Role

- Data modeling
- Data visualization tools
- Conscious listening & story-telling
- Business Intelligence understanding

A **business analyst** improves business processes as intermediary between business & IT.

### SEMESTER 3

ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING	E
TECHNOLOGIES FOR INFORMATION SYSTEMS	E
MULTICHANNEL CUSTOMER STRATEGY	E
SOFT COMPUTING	E
FREE SLOT	E
FREE SLOT	

### SEMESTER 4

MODEL IDENTIFICATION AND DATA ANALYSIS 1	E
DATA MINING AND TEXT MINING	E
THESIS	M