

Modernised Curricula & Short Programmes

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Megatrends 2020-2030

E7 economies double the size of G7 by 2040

80% of middle class in emerging economies

75% faster growth in emerging economies

Emerging economies 50% of global by 2025

59% increase in food demand by 2050

Water crisis is #1 global risk, says WEF

48% think business should be force for good

\$22tn social responsible investments today

1 Shifting economic power
The shift of economic might to emerging markets and developing economies, including China.

2 Climate change and resource scarcity
The impact of climate change as well as an increased strain on the world's resources, including energy, food, metals, and water.

3 Technological breakthrough
The rapid advancement of technology, especially artificial intelligence (AI) and machine learning, is at the centre of all megatrends.

4 Demographics and social change
Changes in global demographics (i.e., world population, density, education level, etc.) will bring social change.

5 Rapid urbanisation
The global migration to megacities, and the challenges and opportunities that emerge as a result.

90% of world data create in last 2 years

1 trillion objects connected by 2022

90% of stock trading now done by algorithm

66% of world is connected at any time

Global population towards 10bn by 2050

13% of us over 65 by 2030, from 8% today

90% of under 25s live in emerging economies

1.5 million people move to cities every week

66% live in cities by 2050, from 54% today

61% of global GDP created by 750 cities

Sources: BlackRock, Bloomberg, Deloitte, IFTF, McKinsey, PwC, WEF, World Bank

+genius

Megatrends 2020-2030

3. Technological breakthrough

CHANGES

Pace of technological change is exponential

Data is the new oil; data connects the world

Technology increasingly automates humanity

Connected and intelligent life

AI and robotics drive improved lifestyles

Healthcare is fundamentally transformed by tech

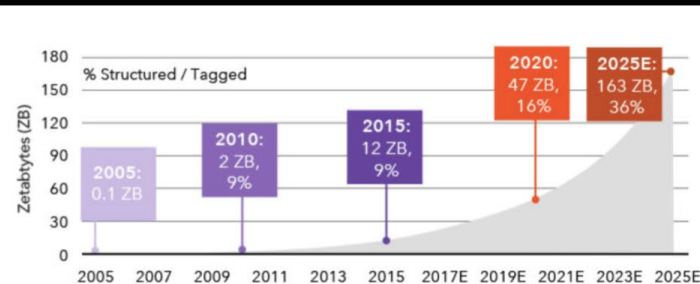
IMPACTS

Sources: BlackRock, Bloomberg, Deloitte, IFTF, McKinsey, PwC, WEF, World Bank

Annual growth rates of emerging technologies



Growth of global data (1ZB is a trillion GB)



+genius

Data Scientists salaries in 2020

Data Scientist Roles and Average Salaries (in \$)

Junior/Associate Data Scientist	91,000
Data Scientist	108,000
A.I./Machine Learning Engineer	127,000
Data Science Manager/Architect	140,000
Chief/Senior/Principal Data Scientist	146,000
Director of Data Science	169,000

Source: Dice.com

Dice

Data Scientist Salary, by Experience (in U.S. \$)

Experience	25th Quartile	Median	75th Quartile
9+ years	108,000	123,000	136,000
6 to 8 years	109,000	122,000	136,000
3 to 5 years	98,000	112,000	126,000
0 to 2 years	88,000	104,000	119,000

Source: Burning Glass

Dice

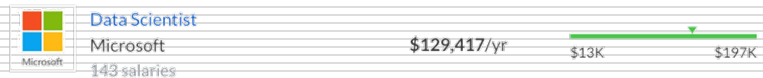
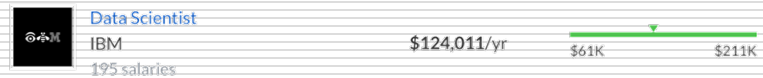
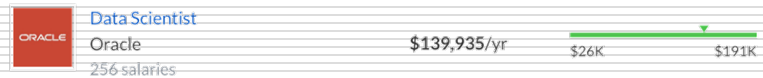
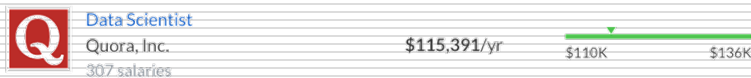
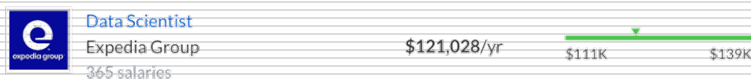
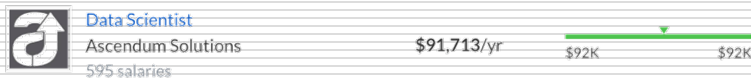
Data Scientists salaries in 2020

Data Scientist Salary, by Education (in U.S. \$)

Education	25th Quartile	Median	75th Quartile
Bachelor's degree	95,000	111,000	125,000
Master's degree	10,000	115,000	129,000
Doctoral degree	101,000	115,000	129,000

Source: Burning Glass

Dice



Data Scientists salaries in 2020

	Position	Mean	Median	Avg Increase	Avg Bonus
France €	Data Scientist	48,268	48,500	0-5%	1,819
	Sr. Data Scientist	70,491	65,000	0-5%	11,554
Germany €	Data Scientist	71,641	62,000	0-5%	1,750
	Sr. Data Scientist	77,108	76,000	16-20%	3,805
Italy €	Data Scientist	33,000	34,000	31-45%	0
	Sr. Data Scientist	52,000	52,000	6-10% / 26-30%	20,000
Netherlands €	Data Scientist	63,890	60,000	0-5%	3,545
	Sr. Data Scientist	77,445	78,283	0-5%	4,262
UK £	Data Scientist	60,687	45,449	0-5%	0
	Sr. Data Scientist	90,436	55,250	31-45%	6,000
Switzerland Fr	Data Scientist	113,428	120,000	6-10% / 16-20%	571
	Sr. Data Scientist	128,933	130,000	0-5%	9,592

<https://bigcloud.io/salary-reports/>

Shortage of Data Scientists in Europe

- ❑ Europe holds a shortage of digital skills, especially into AI and machine learning, which is common across every country.
- ❑ Every major European tech centre ranging from Berlin, Amsterdam, Stockholm, London, Paris, Eindhoven are short of professionals with requisite AI skills.
- ❑ The most demanding high-tech jobs in Europe range from artificial intelligence and deep, machine learning, cloud security/encryption to robotics and blockchain, and fintech technologies.
- ❑ The demand for skills is so high in the EU that European countries are forced to recruit skilled specialists from outside the EU to fill the vacancies.
 - Finland calculates that needs about 15,000 software developers.
 - According to latest research estimates, by 2030, Germany could face a shortage of 3 million skilled workers, with a considerable number of them being IT professionals.

Methodology

- ❑ Identifying the skills
- ❑ Studying successful related curricula
- ❑ Designing the modernized curriculum in Data Science

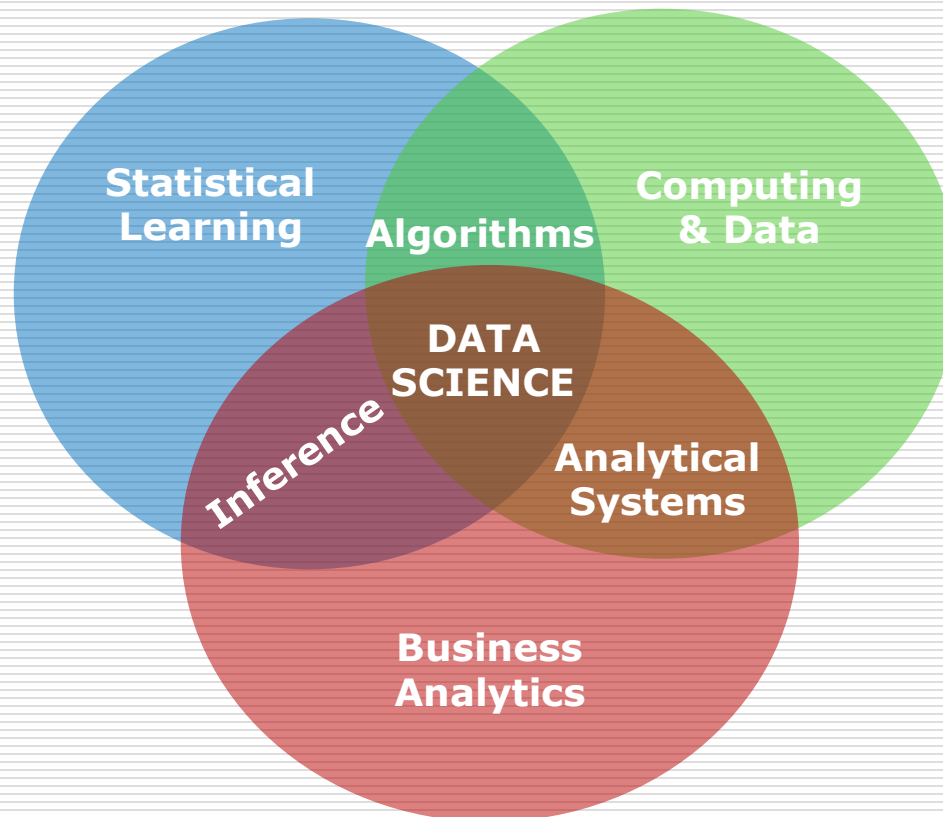
The Data Science programme has been accredited by the Cyprus Agency of Quality Assurance and Accreditation in Higher Education (CYQAA)

Starting Date: September 2021

CYQAA is the competent Authority responsible for ensuring the quality of higher education in Cyprus and for the support of the processes provided by the relevant Legislation, for the continuous improvement and upgrading of higher education institutions and their programs of study

Identifying the skills

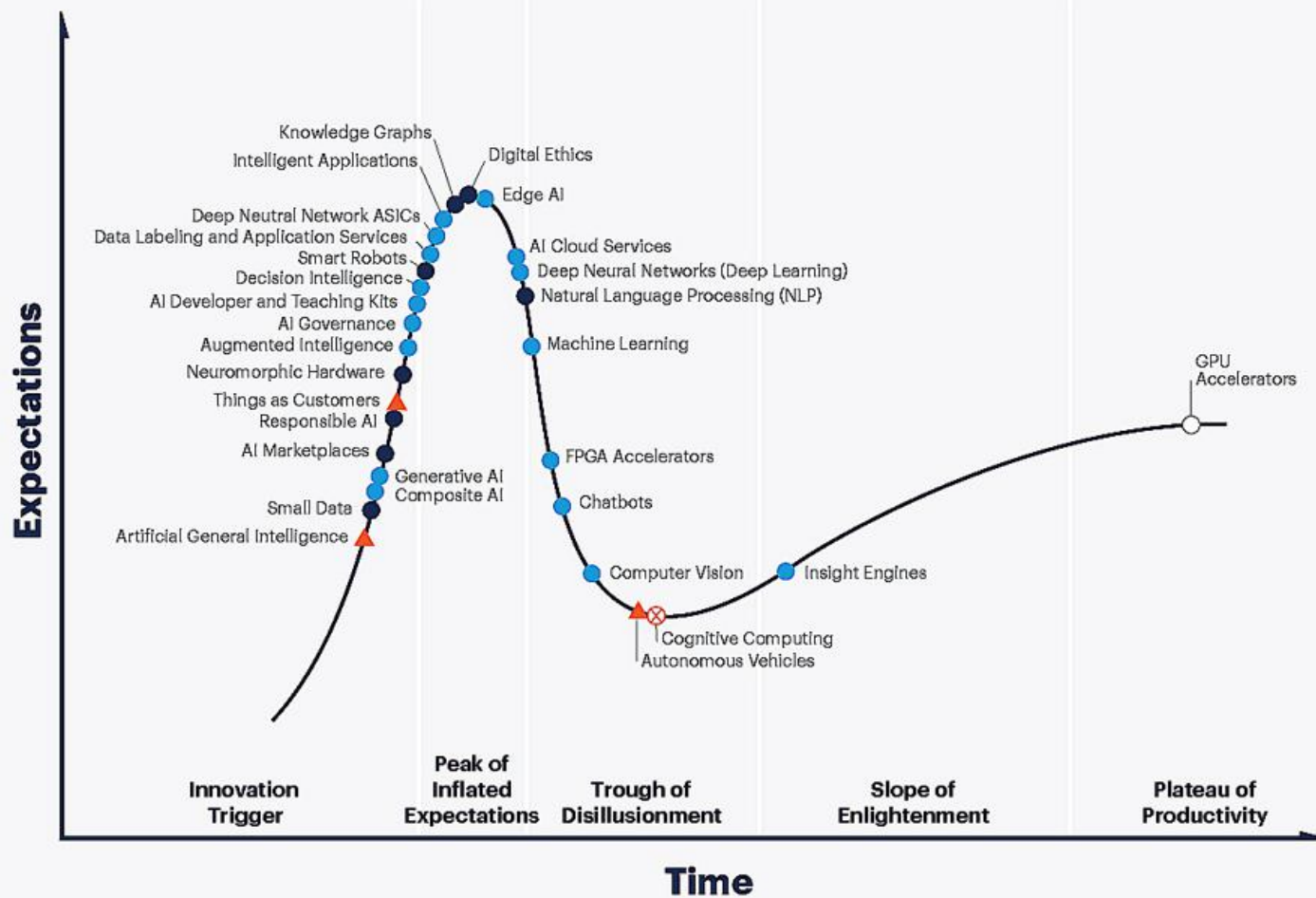
Areas of Application / Scope



Data Scientist Skillset



Hype Cycle for Artificial Intelligence, 2020



Plateau will be reached:

○ less than 2 years

● 2 to 5 years

● 5 to 10 years

▲ more than 10 years

⊗ obsolete before plateau

As of July 2020

gartner.com/SmarterWithGartner

Source: Gartner

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Gartner

Data Science – Multidiscipline programme

□ Business and Administration

- Business Analytics
- Social Networks
- Business Simulations
- Case Studies



□ Computer Science

- Artificial Intelligence, Machine Learning and Neural Networks
- Big Data Platforms and Applications
- Cloud and Edge Computing
- Information Retrieval and Data Mining
- Privacy and Security





□ Mathematics and Statistics


- Bayesian Analysis
- Time Series
- Computational Statistics
- Functional Data Analysis
- Applied Probability




Studying successful related curricula

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Data Science (130) 

MSc 

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Field of Study

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Data Science (130) 



 JACOBS UNIVERSITY

Jacobs University

 Bremen , Germany

MSc in Data Engineering



 MSc

 Full-time

 2 years

 English

 Campus

Data engineering is an emerging profession concerned with big data approaches to data acquisition, data management, and data analysis. The

PROGRAM OF STUDY- OVERVIEW

Master of Science in Data Science

- ❑ **Type:** Conventional - Academic
- ❑ **Duration of studies:** 1,5 year / 3 Semesters + 1 summer semester
- ❑ **Language of Instruction:** English
- ❑ **Total ECTS:** 90
- ❑ **ECTS distribution per semester:**

Year of Study	Fall	Spring	Summer
1	28	28	5
2	29		

Purpose and objectives

- ❑ Offer students the opportunity to acquire **deep knowledge, hands-on experience**, and **research expertise** in one or more fields of Data Science.
- ❑ Prepare graduates able to **pursue careers** in positions of responsibility in either **academia or industry**.
- ❑ Help students to develop their **inquisitive** and **critical thinking skills**, to engage in **independent** and **life-long learning**, and pursue **novelty** and **excellence in scientific and technical work**.
- ❑ Provide **transferable skills in scientific and technical communication** (both written and spoken), gathering and collecting actionable information, collaborative work, creativity and innovative thinking.

Intended learning outcomes (1)

Build strong background in Data Science

- ❑ Master powerful tools that address a wide range of topics in Data Science
- ❑ Acquire statistical skills at an appropriately advanced level
- ❑ Acquire deep knowledge in one or more fields of Data Science
- ❑ Obtain familiarity with basic concepts in other Natural and/or Social Sciences, pertinent to data-driven discovery

Build research foundations

- ❑ Get acquainted with faculty research in fields of Data Science
- ❑ Demonstrate in depth understanding of a breadth of disciplines, and become familiar with the dominant research directions
- ❑ Acquire experience of independent work, ideally so in the context of class research projects

Intended learning outcomes (2)

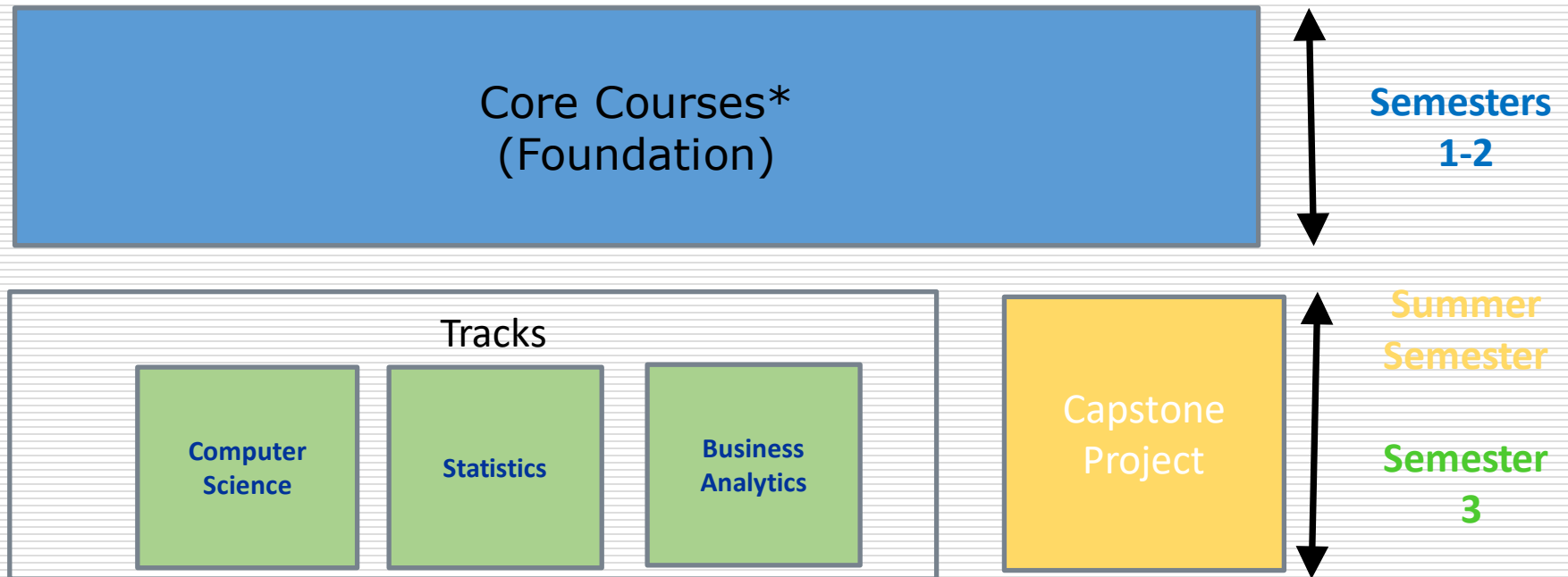
Learn to solve real-world problems

- ❑ Identify and assess the needs of an organization for a data science task
- ❑ Collect and manage data needed
- ❑ Interpret data science analysis outcomes
- ❑ Transform findings into actionable business strategies
- ❑ Communicate data science-related information effectively using audience-appropriate format and delivery
- ❑ Value and safeguard the ethical use of data

Build multi-context skills

- ❑ Develop transferable skills such as: oral and written scientific communication, near fluent use of scientific English, use of information/communication technology, organization and planning of group work
- ❑ Exhibit versatility and innovative thinking in addressing and managing open questions in a variety of contexts, as an essential asset for careers in research, industry, commerce, education and the public sector

Overview of the Program



*individual modules (called *short programmes*) that can be taken separately and provide certificates

Student admission

- Successful applicants to the master programme of Data Science will come from **different undergraduate backgrounds**, including degrees in Statistics, Computer Science, Mathematics, Engineering, Economics, Business, Physics provided that they meet the following requirements:
 - Successful completion courses in **Probability, Statistics or Econometrics** and **fundamental Mathematical courses** (e.g., basic calculus, linear algebra, etc)
 - **Intro to Computer Science** (or an equivalent programming course in Python, R, etc)
 - A satisfactory personal interview

PROGRAM OF STUDY– CONTENT

Structure of the Program of Study

PROGRAM REQUIREMENTS	ECTS
Compulsory courses	48
Elective courses	
a) Courses of specialization	24
b) General Education courses / Free Electives	8
Capstone Project	10
Total ECTS	90

Program of Study – Year 1

First Semester	CS Introduction to Data Science and Analytics	8
	MAS Probability and Statistics for Data Science	8
	MAS Statistical Simulation and Data Analysis	8
	One Elective Course (offered by other entities of the University of Cyprus, e.g. Department of Law, Center for Entrepreneurship etc.)	4
Second Semester	CS Big Data Analytics	8
	BUS Business Analytics Applications	8
	MAS Statistical Learning	8
	One Elective Course (offered by other entities of the University of Cyprus, e.g. Department of Law, Center for Entrepreneurship etc.)	4

Program of Study – Semester 3

Summer Semester	Capstone Project in Data Science (1st Phase)	5
Third Semester	Computer Science Track/ Statistics Track/Business Analytics Track Course	8
	Computer Science Track/ Statistics Track/Business Analytics Track Course	8
	Computer Science Track/ Statistics Track/Business Analytics Track Course	8
	Capstone Project in Data Science (2nd Phase)	5

Restricted Electives

❑ **Computer Science Track**

- Information Retrieval and Search Engines
- Advanced Topics in Data Management
- Natural Language Processing
- Deep Learning
- Data Visualization
- Cloud Computing

❑ **Statistics Track**

- Survey Sampling
- Time Series Analysis
- Multivariate Analysis
- Bayesian Statistics
- Computational Statistics

❑ **Business Analytics Track**

- Managing Business Processes with Information Systems & Analytics
- Project Management using Analytical Tools
- Information Networks
- Quantitative and Qualitative Decision-Making
- Web Analytics for Business
- Data Mining for Business Analytics
- Data Visualization
- Investment
- Financial Theory

Capstone Project in Data Science

- ❑ Structured internship with a company or some other organization during the summer term
 - 2nd year students, 10 ECTS
 - Aims to give students some **professional experience** in a real work environment and help enhance their **soft skills**
- ❑ Group Projects under the supervision of a member of academic staff
- ❑ Specific learning outcomes stipulated in a **learning agreement** between the students, the supervisor and the company
- ❑ The students keep a log file of their work and at the end write a progress report
- ❑ The company is obliged to monitor the progress of the students and to provide relevant mentorship
- ❑ Final assessment is carried out by the company and the supervisor

SHORT PROGRAMMES

Short Programmes

☐ **Data Analytics Using R Language (16 ECTS)**

- Probability and Statistics for Data Science
- Big Data Management

☐ **Data Analytics for Business (16 ECTS)**

- Data Visualisation
- Data Mining for Business Analytics

☐ **Fundamental Data Analytics (16 ECTS)**

- Introduction to Data Science and Analytics
- Data Visualisation

Thank You