

Profile and assessment of PDEng Data Science candidates

Stef van Eijndhoven and Jack van Wijk

Profile

Candidates are creative problem solvers with excellent technical skills. They are team players, who seek interaction with a multidisciplinary environment to tackle problems, they are eager to learn, their attitude shows the responsibility for quality and quantity of knowledge gained. They have a solid background in Mathematics, Statistics, and Computer Science, and strong affinity with Data Science.

1. Candidates possess an academic master degree (MSc) in Mathematics, Statistics, Computer Science, or in a relevant application field of Data Science such as Econometrics and Bio-informatics. The MSc-degree is from an accredited institution comparable to the Eindhoven University of Technology or Tilburg University.
2. Candidates have an academic background that includes:
 - ✓ **Mathematics & Statistics** – a least two semesters of mathematics and statistics. Courses on calculus, linear algebra, statistics, optimization theory, and probability theory are required. Courses on topics as operations research, signal and time series analysis, and dynamical systems are recommended. The courses should indicate that the applicant has achieved the mathematical and statistical maturity to be expected of an upper level mathematics / statistics / econometrics graduate.
 - ✓ **Computer Science** – at least two semesters of computer science. Courses on programming, algorithms & data structures, databases, data mining/machine learning are required. Courses on topics such as object oriented programming and web development are recommended. The courses should indicate that the applicant has achieved solid knowledge and experience with the computer science aspects that are highly relevant for Data Science.
 - ✓ **Data Science** – Candidates show affinity with the field of data engineering or data analytics. They have experience with the application of Data Science technology to real world problems, via projects carried out during their education or their working experience afterwards.

3. Candidates show high **motivation and eagerness** to develop the skills to:
 - ✓ Combine generalist thinking and expert thinking in various data domains
 - ✓ Formulate opportunities and discover value in data
 - ✓ Solve complex problems in a data driven environment.
 - ✓ Demonstrate sense for entrepreneurship, business and industrial processes
 - ✓ Execute projects in a well-managed, professional way, optimally using resources and obeying constraints
 - ✓ Acquire knowledge through a self-directed learning style

4. Candidates have an attitude that shows:
 - ✓ **Technical expertise:** desire to become an expert in one or more data domains with a generalist thinking attitude
 - ✓ **Curiosity:** desire to discover, distill, and model a problem down to a clear set of concepts and hypotheses that can be tested
 - ✓ **Creativity:** desire to look at a problem in different ways and find novel solutions
 - ✓ **Communication skills:** desire to communicate effectively with all stakeholders, on all aspects of any data science project that include requirement elicitation, project progress, developed solutions, up to use of data to tell a story.
 - ✓ **Social skills:** desire to collaborate with others, with similar and different backgrounds, to tackle challenging problems

Assessment

Candidates can enter the program only after having successfully passed the full admission procedure. The procedure has three steps and involves a thorough assessment by means of a Data Challenge Week and an application interview. Data challenge weeks are organized twice each year. The program selects the top 25% from the pool of candidates.

Step 1

The candidate sends online the following documents to the secretariat of the program:

- ✓ Filled out online application form
- ✓ Application letter
- ✓ Curriculum vitae
- ✓ Copy of the MSc-diploma
- ✓ Certified educational master program and grades
- ✓ Proof of level of English language (for example IELTS)
- ✓ Copy of ID or passport

Step 2

Based on the documents send, the program selection committee invites the candidate to take part in an assessment in the form of a 24/7 Data Challenge Week. The criteria for assessing applicants in the Data Challenge Week focus on the profile of the candidate as described above. Thus, besides on their technical background, applicants are assessed on the following distinctive attitudes and skills: creativity, self-awareness, critical thinking, team player, and communication.

Essential elements of the assessment:

- ✓ Candidates write a report. They write a document on their personal understanding of the data sets to be challenged and a personal introduction.
- ✓ Candidates are part of a team and as such take part in all team activities such as group meetings and technical discussions.
- ✓ Candidates give the final presentation at the end of the Data Challenge Week. They present results and conclusions of their group to the representatives of the company or business that introduced the data challenge.
- ✓ Candidates fill out a personality questionnaire. They fill out the MPT-BS : Multi-Cultural Personality test – Big Six.

Step 3

The final step of the admission procedure is the job-interview. It is a behavioral interview, with a strong focus on technical background, motivation and the assessment criteria. The job interview is arranged immediately after the assessment. The scientific director, program manager and coach professional development form the interview committee.