

Data Science (Graduate Apprenticeship) BSc (UTBSCDATSC1F): Revised DPT

Overview

This is a revision of the existing DPT for the undergraduate Graduate Apprenticeship in Data Science, due to changes in the courses available, and discussions regarding the details of 3rd and 4th year placements at the Industrial partner(s).

The GA in Data Science is a 4 year program which allows undergraduates to earn a qualification in Data Science while gaining work experience during placements at companies who are hosting the apprentices. The academic content of this program is loosely based on the CS and Maths degree, with a development towards Data Science, and some specialist “Soft Skills” courses in the later years. Placements have the following durations and timings, and some of the work done during these placements will feed into Soft Skills courses and the 4th year project:

- **Placement 1:** 10-11 week placement during June-August following year 1 of studies
- **Placement 2:** 10-11 week placement during June-August following year 2 of studies.
- **Placement 3:** 8 month placement for semester 2 of year 3 and summer afterwards (January-August of year 3).
- **Placement 4:** 4 month placement including semester 2 of year 4 (January to end-April of year 4).

The “work done” during the 1st and 2nd year placements will not be assessed till the following academic year:

- WBL-A (INFR09052, 20 credits) will be formally assessed in year 3, but depends on the experience obtained in Placements 1 and 2.
- WBL-B (INFR10075, 40 credits) will be formally assessed in year 3, and depends on the experience acquired during Placement 3.

In what follows we provide the revised version of the DPT, giving details of the program for Years 1 to 4, for 2019/20 entrants.

We also plan to update years 3 and 4 of the current DPT for 2018/19 entrants to match this new DPT.

Additional notes

Some new courses appear in this revised DPT. These include the new 2nd year courses (Informatics 2 – Foundations of Data Science (20 credits), Informatics 2- Software Engineering and Professional Practice (20 credits)) that are presented in the “DPT Updates” paper at this Exam Board.

We also have proposed a new “4th year project” (full year) course, titled “**Honours Project (Data Science Graduate Apprenticeship)**” (40 points) to include in this DPT, which makes explicit the need for a connection between the Industrial Partner and the project the Graduate Apprentices will work on. We believe it is best to formally require this, as the Apprentices will spend semester 2 of their 4th year on Placement and will have 7 weeks of that time for working on the project. Otherwise the project is similar to our standard 4th year project, though there is some leeway for a shorter dissertation, or perhaps a different submission deadline. We will also ask students to include a short

chapter in the Dissertation reflecting on the considerations needed to deliver their project in partnership with the Industrial host, in order to satisfy the “work based” requirements for this degree.

We conclude by mentioning that we believe most students on this program are likely to choose one of the “Informatics 2” options as their Optional course in 2nd year. That will somewhat constrain their options in years 3 and 4, as they will not be qualified for the Optional Maths courses.

However, there is the option for a Mathematically-oriented student to choose “[Fundamentals of Pure Mathematics \(MATH08064\)](#)” as their optional course in 2nd year, which will allow them to satisfy the course pre-requisites for one of [Honours Differential Equations \(MATH10066\)](#) or [Honours Analysis \(MATH10068\)](#) in 3rd year, and then take some 4th year Maths options from the second “Options” box for 4th year.

The [Practical Introduction to High Performance Computing \(INFD11009\)](#) course is a full year online course which would be started in Semester 1 and completed in semester 2 (while the apprentices are in Placement). The assessment structure is 25% in S1 and 75% in S2 so this does not push the students to over 60 credits in S1.

Proposed DPT for 2019/20 entrants (and years 3-4 for 2018/19 entrants)

Year 1

Compulsory Courses:

- [Introduction to Linear Algebra \(MATH08057\)](#): 20 credits, S1
- [Informatics 1 – Introduction to Computation \(INFR08025\)](#): 20 credits, S1
- [Calculus and Its Applications \(MATH08058\)](#): 20 credits, S2
- [Proofs and Problem Solving \(MATH08059\)](#): 20credits, S2
- [Informatics 1 – Object-Oriented Programming \(INFR08029\)](#): 20 credits, S2

Course Options:

Select 20 credits from the following options:

- [Fundamentals of Algebra and Calculus \(MATH07003\)](#): 20 credits, S1
- [Introduction to Data Science \(MATH08077\)](#): 20 credits, S1
- All level 7 and 8 courses in Schedules A-Q, T and W

Year 2

Compulsory courses:

- [Several Variable Calculus and Differential Equations \(MATH08063\)](#): 20 credits, S1
- [Probability \(MATH08066\)](#): 10 credits, S1
- [Facets of Mathematics \(MATH08068\)](#): 10 credits, S1
- [Informatics 2 – Introduction to Algorithms and Data Structures \(INFR08026\)](#): 20 credits, FY
- Informatics 2 – Foundations of Data Science : 20 credits, FY
- [Statistics \(year 2\) \(MATH08051\)](#): 10 credits, S2
- [Computing and Numerics \(MATH08065\)](#): 10 credits, S2

Course Options:

Select 20 credits from the following options:

- [Informatics 2D – Reasoning and Agents \(INFR08010\)](#): 20 credits, S2
- Informatics 2 – Software Engineering and Professional Practice: 20 credits, S2
- [Fundamentals of Pure Mathematics \(MATH08064\)](#): 20 credits, S2

Year 3

Compulsory Courses:

- [Numerical Linear Algebra \(MATH10098\)](#): 10 credits, S1
- [Statistical Methodology \(MATH10095\)](#): 10 credits, S1
- [Introductory Applied Machine Learning \(INFR10069\)](#): 20 credits, S1
- [Work-Based Professional Practice A in Data Analytics \(INFR09052\)](#): 20 credits, S1
- [Work-Based Professional Practice B in Data Analytics \(INFR10075\)](#): 40 credits, S2

Course Options:

Select 20 credits from the following options:

Note: Not all options are guaranteed to run in a particular year. Availability is subject to change, timetabling, and demand.

- [Database Systems \(INFR10070\)](#): 20 credits, S1
- [Software Design and Modelling \(INFR10064\)](#): 20 credits, S1
- [Honours Analysis \(MATH10068\)](#): 20 credits, S1
- [Honours Differential Equations \(MATH10066\)](#): 20 credits, S1

Year 4:

Compulsory Courses:

- [Statistical Consultancy \(MATH10092\)](#): 10 credits, S1
- [Introduction to High-Performance Computing \(INF11009\)](#): 20 credits, FY
- [Honours Project \(Data Science Graduate Apprenticeship\)](#): 40 credits, FY

Course Options:

Select 20 credits from the following options:

Note: Not all options are guaranteed to run in a particular year. Availability is subject to change, timetabling, and demand.

- [Database Systems \(INFR10070\)](#): 20 credits, S1
- [Software Design and Modelling \(INFR10064\)](#): 20 credits, S1

Also select 30 credits from the following options:

Note: Not all options are guaranteed to run in a particular year. Availability is subject to change, timetabling, and demand.

- [Financial Mathematics \(MATH10003\)](#): 10 credits, S1
- [Fundamentals of Operational Research \(MATH10065\)](#): 10 credits, S1
- [Honours Analysis \(MATH10068\)](#): 20 credits, S1
- [Honours Differential Equations \(MATH10066\)](#): 20 credits, S1
- [Algorithmic Foundations of Data Science \(INFR11156\)](#): 10 credits, S1
- [Extreme Computing \(INFR11088\)](#): 10 credits, S1
- [Human-Computer Interaction \(INFR11017\)](#): 10 credits, S1
- [Machine Learning and Pattern Recognition \(INFR11130\)](#): 20 credits, S1
- [Social and Technological Networks \(INFR11124\)](#): 10 credits, S1
- [Usable Security and Privacy \(INFR11158\)](#): 10 credits, S1