Data Scientist Integrated Degree Apprenticeship

Level 6

End-Point Assessment Plan

Summary of End-Point Assessment

This End-Point Assessment (EPA) plan has been designed to enable the apprenticeship to be completed in accordance with the Data Scientist Degree Apprenticeship Standard designed by employers. The Data Scientist Degree Apprenticeship leads to a Bachelor Degree (Level 6) in Data Science that is contextualised for occupational competency. It has been designed by employers to provide opportunities for as wide a range of employers and individuals as possible.

The achievement of the End-Point Assessment ensures that the apprenticeship standard has been met.

The EPA has three assessment methods:

1. Knowledge Test, followed by
2. Report (based on a work-based project) and
3. Professional Discussion (informed by a portfolio)

Successful completion of the EPA will consist of 60 credits and signify the completion of the apprenticeship as well as the full Degree.

The EPA must be completed over a maximum total assessment time of 6 months after the apprentice has met the EPA gateway requirements. The apprenticeship will typically take 36 months before the commencement of the end point assessment.

Performance in the Knowledge Test will be graded Fail or Pass. The Report and Professional Discussion will be graded as Fail, Pass or Distinction. These grades will be combined to determine the overall apprenticeship grade of Fail, Pass, Merit or Distinction.

The remainder of this EPA plan will set out the approach to End-Point Assessment, including what will be assessed, how it will be assessed and the roles of the Higher Education Institute (HEI), Independent Assessor and Apprentice in the EPA process.

Assessment Method and Grading	KSB to be assessed	Assessed by
Knowledge Test *Fail / Pass*	Knowledge listed at Annex A	The HEI will be the End-Point Assessment organisation (EPAO) and appoint an Independent Assessor. The Independent Assessor should be sourced from another university or organisation, or, if none of the above options are available, another department within the same university and not have been involved in the on-programme delivery.
Report (based on a work-based project) *Fail / Pass / Distinction*	Skills and Behaviours (SB) listed at Annex A	As above
Professional Discussion (informed by a portfolio) *Fail / Pass / Distinction*	Knowledge, Skills and Behaviours (KSB) listed at Annex A	As above

End-Point Assessment – Summary of roles and responsibilities

1. Knowledge Test (Multiple-Choice)	
HEI (as EPAO)	• Responsible for arranging and managing the delivery of the Knowledge Test, in consultation with apprentice's employers and against the knowledge identified in Annex A
Apprentice	• Must complete the test during the EPA period
Independent Assessor	• Assesses against the knowledge in Annex A and grades the Knowledge Test in accordance with End-Point Assessment grading descriptors on page 8

2. Report (based on a work-based project)	
HEI (as EPAO)	• Arranges and manages the delivery of the report to ensure defined conditions are satisfied.
Apprentice	• Submits the report within a 6-month period after the EPA gateway • Submits the report ensuring it addresses the Skills and Behaviours (SBs) identified in Annex A
Independent Assessor	• Assesses against the SB in Annex A and grades the report in accordance with End-Point Assessment grading descriptors on page 8

3. Professional Discussion	
HEI (as EPAO)	• Arranges the Professional Discussion
Apprentice	• Clearly answers the questions posed • Must complete the professional discussion during the EPA period
Independent Assessor	• Ensures consistency and objectivity throughout the discussion • Probes/explores the KSB identified at Annex A • Assesses against the KSB in Annex A and grades the discussion in accordance with End-Point Assessment grading descriptors on page 8 • Records key points about the apprentice's responses

Assessment Gateway

The EPA should only start once the employer is satisfied that the apprentice is consistently working at or above the level set out in the occupational standard, that the pre-requisite gateway requirements for EPA have been met and that they can be demonstrated to the EPAO.

The employer, in conference with the EPAO, needs to ensure that the apprentice has:

- Met all the KSBs in the standard and passed all the Degree Modules
- Completed a work-based project (to inform the Report) that consists of 30 credits
- Completed a portfolio (to inform the Professional Discussion)
- Achieved Level 2 English and Maths. For those with an education, health and care (EHC) plan or a legacy statement, the English and Maths minimum requirement is Entry Level 3. British Sign Language qualifications are an alternative to English qualifications where this is the apprentice's primary language.

Requirements for the work-based project

The work-based project will inform the report during the EPA. The apprentice should complete a project prior to the EPA gateway and must demonstrate the Skills and

Behavioural (SB) outcomes as identified for the report method in Annex A. The apprentice should show evidence of the planning and execution of the work-based project, including an evaluation of the processes followed, measurement of the SB, a summary of learning derived from the execution of the work-based project, and recommendations for future activities.

- HEI's will agree with the employer and apprentice a suitable work-based project topic that will cover the SB identified in Annex A to be completed before the EPA gateway via online or paper based
- The project should be based on a Data Science solution that forms part of the apprentice's role
- All parties should ensure that the apprentice has access to the required systems, data and tools to complete the project
- The appropriate location and time should be set aside by the employer for the apprentice to plan, undertake and write their project; this can be away from the work place or a quiet area within the workplace
- On completion, the apprentice must provide a signed statement to confirm it is his/her own work.

Requirements for the portfolio

The portfolio presents evidence from real-work projects (excluding the project from which the assessed Project Report is produced) and is used to help the apprentice to answer questions in the Professional Discussion. The portfolio will be created pre-gateway and before End-Point Assessment starts. It contains evidence from projects that have been completed, usually, towards the end of the apprenticeship. It will showcase elements of work that describe the apprentice's competency against each of the areas identified in Annex A in relation to the Professional Discussion. The portfolio enables the apprentice to demonstrate how they have applied their knowledge, skills and behaviours in a real-work environment to achieve real-work objectives. The portfolio is not evidence that the learning has taken place, but is evidence that the apprentice has applied the knowledge, skills and behaviours in the Standard.

Employers, with support from the university (as end-point assessment organisation), will assist the apprentice to assemble their portfolio to ensure that the portfolio is complete, that it covers the required knowledge, skills and behaviours in Annex A for the Professional Discussion and has been done to a satisfactory standard.

The portfolio must be an e-portfolio. It must include:

- a list of contents and a map of contents against the knowledge, skills and behaviours;

- a brief introduction/commentary by the apprentice, produced towards the end of their apprenticeship and highlighting, where appropriate, anything they would do differently;
- evidence from between six and eight real work projects/pieces of work;
- a testimonial from the employer, relating particularly to behaviours shown in the workplace;
- a signed statement from the employer and university confirming this as being the apprentice's own work and confirming that, in their view, the work demonstrates the required competence against the Standard; and
- a signed statement from the apprentice confirming this as their own work.

End-point - Assessment

All assessment methods must be successfully completed within a 6-month period after the EPA gateway and consist of the following:

Knowledge Test (Multiple-Choice) (1 hour)

The apprentice must undertake the Knowledge Test first and can only proceed to the other elements of the End-Point Assessment if they pass the Knowledge Test. They will have a maximum of 1 hour to complete the test and cannot refer to reference books or materials.

The EPAO, against the knowledge identified in Annex A, will develop a Knowledge Test that consists of 30 multiple-choice questions. Each question should present the apprentice with 4 options, from which the apprentice must select one or multiple correct options. They will maintain a question bank of sufficient size to minimise predictability and ensure apprentices have a different set of questions in case of re-sits/re-takes. The question bank will be refreshed annually. The EPAO will ensure the Knowledge Test is available for apprentices within their 6-month EPA time-period.

Apprentices must take the Knowledge Test in the presence of an EPAO administrator/invigilator. The maximum administrator/invigilator to apprentice ratio must be 1 to 30. Reasonable adjustments must be made for apprentices who need them in line with normal EPAO procedures.

Assessment of the Knowledge Test and grading

The Independent Assessor will mark the Knowledge Test out of 30 following a marking guide produced by the EPAO and grade it based on the grading descriptors (page 8). Electronic marking is permitted.

Report (on a work-based project)

The apprentice must submit the report to the EPAO within six weeks of the agreed EPA start date (the point at which the apprentice passes the gateway).

The apprentice will compose a written report of 7,500 (+/- 10%) words in which they will demonstrate all the SB as set out in Annex A and should be presented in the form of a hard copy printed report, but should also be provided in electronic form (e.g. word document).

The Report should cover the work-based project objectives, the apprentice's responsibilities, the action taken by the apprentice (in planning and executing the project) and results and conclusions. The report should be laid out as a business style report as defined below, with an executive summary.

The report must include an annex containing between six and eight pieces of evidence relating to the project. The annex must include a mapping of evidence to the SB assessed by this assessment method.

The report should include:

- Executive summary. (This is no more than one side - which summarizes the content of the report. It must be comprehensible to someone who has not read the rest of the report.)
- Introduction. (The scope or hypothesis of the project and terms of reference, setting the scene for the remainder of the report.)
- Background. (A review chapter, describing the background work or research undertaken at the beginning of the project period.)
- Work undertaken: Several chapters describing the work that has been undertaken.
- Outputs. A chapter describing the outputs, deliverables or artefacts that have been produced as a result of the project.
- Further work. (A chapter describing possible ways in which the work could be continued or developed.)
- Conclusions. (A statement of conclusions relating the work done, and outputs produced to the initial hypothesis and terms of reference.)
- References, annex and appendices.

The evidence must be attributable to the apprentice, in full. Evidence must be accompanied by a statement confirming that it has been completed by the apprentice, signed by the apprentice and their employer. Example evidence may include:

- Sources of data
- Reports from other areas of the business or customers
- Customer requirements

- Emails

This list is not definitive and other evidence sources are permissible. The annex must include a mapping of the evidence to the SB assessed by this assessment method – see Annex A.

EPAO's Supervision and Support for the Project Report

The EPAO and assessor will support the apprentice, ensuring they have provided the structure of the report as indicated above and discussed the knowledge, skills and behaviours that will be assessed. No formal structure required.

Assessment of the Report and grading

The EPAO will arrange for the report to be passed to their appointed independent assessor who will report against the KSBs in Annex A and grades the report using the grading descriptors on page 8.

Reasonable adjustments must be made for apprentices who need them (e.g. for those with as disability) in line with normal EPAO procedures.

Professional Discussion

The apprentice will only proceed to take the Professional Discussion assessment if they have completed and submitted the Project Report to the independent assessor.

Practical Requirements for the Professional Discussion:

- It will be undertaken by the same independent assessor who will assess and make the grading decision.
- The apprentice should have at least seven days' notice of the date/time and location of the Professional Discussion.
- The independent assessor prepares for the Professional Discussion by reviewing the portfolio content in advance of the Professional Discussion.
- It will last 90 minutes (+/- 10%).
- It will be conducted face to face or in exceptional circumstances via live video media.
- It will be conducted in a suitable location. This may be at the university or employer location as appropriate.
- The independent assessor must put the apprentice at ease and give the apprentice the opportunity to do his/her very best.

Content

- The Professional Discussion will focus on assessing how the knowledge, skills and behaviours outcomes have been achieved and will not relate to the Project Report.

- A standard framework of Professional Discussion questions will be defined by the independent assessor and must cover the outcomes specified in Annex A.
- The assessor will use the questions to verify the outcomes have been met and will explore any gaps or areas of uncertainty following their reading of the portfolio.

The Professional Discussion should give the apprentice the best possible opportunity to get the best possible result. The apprentice uses their portfolio to answer questions in the Professional Discussion and may also reference other work they have undertaken in the workplace. The Professional Discussion will not reference the Project Report, as this evidence has already been assessed. Both the independent assessor and the apprentice will have access to the portfolio before and during the Professional Discussion and the apprentice can also bring any additional documentation they may want to use.

Delivery of the Professional Discussion

To assist the independent assessor, a structured brief and framework of questions will be developed by the EPAO. In addition, a clear set of assessment criteria will be developed by the EPAO based on the fail / pass / distinction descriptors (see grading descriptors page 8), and this assessment criteria will also be provided to the apprentice prior to them undertaking the Professional Discussion.

The Professional Discussion is a one-to-one, although a second independent assessor may be present for moderation or training purposes and/or when reasonable adjustments are required.

The main points from the Professional Discussion and the conclusions, will be documented by the independent assessor within 48 hours of it being completed. Reasonable adjustments must be made by the EPAO for people who need them (e.g. people with a disability).

Assessment of the Professional Discussion

The independent assessor marks the professional discussion and grades it based on the grading descriptors on page 8.

End-Point Assessment – final judgement

Following the completion of the Knowledge Test, Report and Professional Discussion the Independent Assessor will make the final judgement and grading.

Successful completion of the EPA will result in the achievement of the apprenticeship standard and a Bachelor's Degree in Data Science.

Independence

To ensure independence, the EPA must have an Independent Assessor from a HEI who is listed on the Register of End-Point Assessment Organisations and who has not been involved in the delivery of the programme. Independent assessors should be sourced from another university or organisation or, if none available, another department within the same university and not have been involved in the on-programme delivery. The Independent Assessor will conduct the EPA and assess and grade against the knowledge, skills and behaviours in the Data Scientist standard.

End-Point Assessment – Grading

Knowledge Test

Pass:

1. Meets Knowledge criteria in Annex A (only those marked as assessed in "Knowledge Test"). Score 60% to 100%.

Fail:

Does not meet all Pass criteria. Score <60%.

Report

Pass:

1. Clearly comprehends the problem and reformulates the problem into a Data Science task. Applies scientific method throughout to design an experiment, test hypotheses, and present results. Explains decisions made to deliver desired organisational outcomes. Collaborates with others to gather requirements and to seek feedback from stakeholders. (S1, B4)
2. Clearly identifies and explains data engineering elements of the project, including rationale for choices of data handling tools and techniques. Identifies their personal responsibilities in the process. (S2)
3. Clearly explains the choice of tools and techniques throughout all elements of the project. Describes the reasons for selecting the chosen algorithms, data structures, languages and tools, and is clear about their personal responsibility in the process. Acts to maximise reproducibility and systematic quality, and works in accordance with recognised standards. (S3)
4. Clearly shows the analysis, modelling, and statistical evaluation of the results performed during the project. Demonstrates how the results inform and improve

organisational outcomes. Clearly explains why the chosen techniques were appropriate. (S4, B4)

5. Shows how the results of the project have been implemented. Explains the rationale for the engineering and architecture decisions made, against technological and organisational criteria. Assesses the value of the data and the implemented solution, and return on investment. (S5)

6. Written communication is clear and structured and appropriate for the organisation in which they are working. Recommendations are actionable. Visualisations and/or dashboards are effective, and appropriately tailored for the data and organisational context. (S6)

7. Displays scientific integrity and transparency. Shows neutrality in explaining the limitations of approach and results, and the extent of their applicability to decisions in the organisation. (B5, S1)

8. Applies appropriate project management techniques with reference to impact on organisational goals. (S8)

Distinction:

Meets all Pass criteria, plus:

1. Puts the problem in a wider context. Produces innovative methods and results that go beyond the original scope. Demonstrates a thorough understanding and impact of the organisational goals through proactive and independently collaboration with a wide range of stakeholders. (S1, B4)

2. In-depth understanding of results in the context of the organisational problem through detailed analysis. Has evaluated and compared a variety of methods for suitability, referencing external benchmarks where appropriate. (S4)

3. Explains in detail the approaches, tools and techniques used. Clearly explains their advantages and disadvantages in comparison to alternatives, and applies them appropriately. (S3)

4. Written narrative is compelling. Delivery of results is appropriately tailored to the needs of multiple different audiences within the organisation to maximise impact. (S6)

5. Understands the considerations and challenges encountered when putting data science work into production: in general, and specific to their organisation. Shows appreciation of the engineering discipline required to make data science products effective. (S2, S5)

6. Clearly illustrates the impact of the project in enabling effective change. (S8)

Fail:

1. Does not meet all Pass criteria.

Professional Discussion

Pass:

1. Clearly explains data science principles in the context of the data science community and understands the application of these theories and concepts to organisational situations. (K1, B4).
2. Clearly explains the importance and impact of governance, security, bias, ethics and compliance on data science work. (K2)
3. Explains Clear examples of where governance, security or compliance issues were handled during work completed. (K2)
4. Clearly explains patterns commonly found in the real-world data, and how these can be used to reveal abnormal or exceptional patterns and insights. Demonstrates use of evidence and analytics in making decisions. (K3.3, K5.3)
5. Verbal communication is clear, with support materials appropriate to the organisational context. Can articulate the rationale for the selection of support materials, visualisation methods and/or dashboards. Can explain how messages were tailored to different audiences and how the narrative supports decision making. (S6)
6. Explains how collaborative relationships were built and maintained at strategic and operational level. Can explain how their interactions were tailored to the needs and feelings of different groups. Gives specific examples of one or more situations where trust had to be built, and how that was achieved. Listens actively. (S7)
7. Gives examples of inquisitive approach, exploring varied questions, data, and opportunities. Demonstrates tenacity in the search for improvement. Shows relentless pursuit of new and creative solutions to challenges. (B1)
8. Explains how understanding the feelings and needs of others enable a more collaborative and productive working environment, especially in regard to multi-disciplinary teams, ethics and diversity. (B2)
9. Explains how, during the life of a piece of work, they were able to adapt to the changing environment, timescales, and be pragmatic in the face of organisational needs and constraints. (B3)
10. Shows they have kept up to date with emerging trends and current thinking outside of their organisational/educational environment, and engaged with the data science community. (B6)

Distinction:

Meets all Pass criteria, plus:

1. Clearly expresses passion and wider reading beyond their current organisational context and makes links back to their current work. (K1, B4)
2. Demonstrates understanding of the reasons why common data patterns occur, and how this changes a Data Scientist's approach to new scenarios. Explains the benefits

of using data and analytics in decision-making, and problems which may arise when this is not done well. (K3.3, K5.3)

3. Explains complex concepts clearly. Identifies and explains alternative techniques, tools, algorithms, data or approaches which would be appropriate to other scenarios or audiences. Gives wide ranging examples and context which show awareness of considerations beyond their day-to-day work. (S6)

4. Explains one or more situations where relationships and personal interactions challenged the success of the project, and the techniques used to improve those relationships to promote trust and collaboration. (S7)

Fail:

1. Does not meet all Pass criteria.

Overall Grade

The overall grade will be calculated as follows:

Assessment Method	Grading				
Knowledge Test	Pass	Pass	Pass	Pass	Fail any assessment method
Report	Pass	Distinction	Pass	Distinction	
Professional Discussion	Pass	Pass	Distinction	Distinction	
Overall	**Pass**	**Merit**	**Merit**	**Distinction**	**Fail**

Re-sits and Re-takes

- Apprentices who fail one or more EPA method may be offered the opportunity to take a re-sit/retake.
- Re-sits/re-takes must not be offered to apprentices wishing to move from pass to merit or distinction or from merit to distinction. A re-sit does not require further learning, whereas a re-take does.
- The apprentice's employer will need to agree that a re-sit/re-take is an appropriate course of action. Apprentices should have a supportive action plan to prepare for the re-sit/re-take.
- An individual EPA method re-sit/re-take must be taken within 12 months of the original EPA, otherwise the entire EPA must be retaken.
- The maximum grade awarded to a re-sit/re-take will be pass, unless the EPAO identifies exceptional circumstances beyond the apprentice's control accounting for the original fail.

Quality Assurance – internal

End-Point Assessment Organisations for this EPA must:

- Provide end-point assessment guidance, where required and appropriate, to apprentices, employers and training providers in relation to the requirements of the knowledge test, report, professional discussion and marking of the end point assessment methods.
- Develop and maintain a single set of assessment tools that are used by all to carry out assessments.
- Ensure independent assessors make consistent and reliable assessment and grade judgements through moderation.
- Develop knowledge tests to meet the needs of the specialised role, consulting with representative industry experts when developing the knowledge test.
- Ensure that there is consistency and comparability in terms of the breadth and depth of the knowledge test, to ensure assessments are reliable, robust and valid and ensure competency is consistent across the industry.
- Operate annual moderation of assessment activity and decisions, through examination of documentation and observation of activity, with a minimum of 5 or 15% whichever is the greater of each Independent Assessors assessments moderated
- Develop compensatory assessment for learners with special requirements to allow reasonable adjustments to be made to assess the knowledge, skills and behaviours of the apprentice through alternative assessment techniques. While these will remove barriers to participation, they must be designed to ensure judgements do not compromise health and safety and legal requirements.
- Appoint and approve independent assessors for the purposes of conducting the knowledge test, report and professional discussion and grading, based on a check of knowledge, experience and independence.
- Appoint and approve independent assessors to mark the knowledge test and provide the marking guidance, based on a check of knowledge, experience and independence. An assessor should:
    - be an academic or professional data science practitioner working in the industrial environment would be required
    - be fully familiar with the Data Science Standard agreed by the trailblazer group.
    - need detailed knowledge of the BSc Data Science Course designed by the HEI and
    - have experience of teaching and assessment at undergraduate level in the University/HEA sector.
    - Professional development requirements would need to be agreed based upon the profile of the assessor identified for the EPA.
- Provide annual training for independent assessors in terms of the requirements of the operation and marking of the assessment tools and grading
- Provide annual training for independent assessors in undertaking fair and impartial assessment and making judgements about performance and the application of knowledge and behaviours within a workplace setting.

- Provide documentation and guidance in relation to the end-point assessment i.e. making reasonable adjustment, eligibility to enter end point assessment and conflict of interest.
- Hold bi-annual standardisation events for assessors to ensure consistent application of the guidance.
- Ensure end-point assessment organisation moderators are trained in assessment and assurance processes and undertake regular continuing professional development.
- Develop and manage a complaints and appeals procedure.
- Report to the employer/training provider on any issues that arise in relation to the apprenticeship assessment process.

Quality Assurance – external

The Institute for Apprenticeships is exploring whether QAA can undertake external quality assurance for this standard, and arrangements will be confirmed by August 2018.

Implementation

Affordability

The following factors should ensure the EPA is affordable:
- Employers premises should be used for EPA venues where possible
- Remote assessment is permissible, reducing travel costs
- The Report is based on real work completed for the apprentice's employer, adding value to the employer

Volumes

The employer group has identified 85 Apprenticeship places for September 2018. This number is likely to grow as the Degree Apprenticeship enters its second and subsequent cohorts.

Annex A

Knowledge Skills and Behaviours on the occupational standard for Data Scientist mapped against the EPA methods

Knowledge *The apprentice knows:*	Professional Discussion	Report	Knowledge Test
1. The context of Data Science and the Data Science community in relation to computer science, statistics and software engineering. How differing schools of thought in these disciplines have driven new approaches to data systems.	X		
2. How Data Science operates within the context of data governance, data security, and communications. How Data Science can be applied to improve an organisation's processes, operations and outputs. How data and analysis may exhibit biases and prejudice. How ethics and compliance affect Data Science work, and the impact of international regulations (including the General Data Protection Regulation.)	X		
3. How data can be used systematically, through an awareness of key platforms for data and analysis in an organisation, including:	X		X
3.1. Data processing and storage, including on-premise and cloud technologies.			X
3.2. Database systems including relational, data warehousing & online analytical processing, "NoSQL" and real-time approaches; the pros and cons of each approach.			X
3.3. Data-driven decision making and the good use of evidence and analytics in making choices and decisions.	X		
4. How to design, implement and optimise analytical algorithms – as prototypes and at production scale – using:			X
4.1. Statistical and mathematical models and methods.			X
4.2. Advanced and predictive analytics, machine learning and artificial intelligence techniques, simulations, optimisation, and automation.			X

4.3. Applications such as computer vision and Natural Language Processing.			X
4.4. An awareness of the computing and organisational resource constraints and trade-offs involved in selecting models, algorithms and tools.			X
4.5. Development standards, including programming practice, testing, source control.			X
5. The data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets:	X		X
5.1. Sources of data including but not exclusive to files, operational systems, databases, web services, open data, government data, news and social media.			X
5.2. Data formats, structures and data delivery methods including "unstructured" data.			X
5.3. Common patterns in real-world data.	X		

Skills *The apprentice can:*	Professional Discussion	Report	Knowledge Test
1. Identify and clarify problems an organisation faces, and reformulate them into Data Science problems. Devise solutions and make decisions in context by seeking feedback from stakeholders. Apply scientific methods through experiment design, measurement, hypothesis testing and delivery of results. Collaborate with colleagues to gather requirements.		X	
2. Perform data engineering: create and handle datasets for analysis. Use tools and techniques to source, access, explore, profile, pipeline, combine, transform and store data, and apply governance (quality control, security, privacy) to data.		X	

3. Identify and use an appropriate range of programming languages and tools for data manipulation, analysis, visualisation, and system integration. Select appropriate data structures and algorithms for the problem. Develop reproducible analysis and robust code, working in accordance with software development standards, including security, accessibility, code quality and version control.		X	
4. Use analysis and models to inform and improve organisational outcomes, building models and validating results with statistical testing: perform statistical analysis, correlation vs causation, feature selection and engineering, machine learning, optimisation, and simulations, using the appropriate techniques for the problem.		X	
5. Implement data solutions, using relevant software engineering architectures and design patterns. Evaluate Cloud vs. on-premise deployment. Determine the implicit and explicit value of data. Assess value for money and Return on Investment. Scale a system up/out. Evaluate emerging trends and new approaches. Compare the pros and cons of software applications and techniques.		X	
6. Find, present, communicate and disseminate outputs effectively and with high impact through creative storytelling, tailoring the message for the audience. Use the best medium for each audience, such as technical writing, reporting and dashboards. Visualise data to tell compelling and actionable narratives. Make recommendations to decision makers to contribute towards the achievement of organisation goals.	X	X	
7. Develop and maintain collaborative relationships at strategic and operational levels, using methods of organisational empathy (human, organisation and technical) and build relationships through active listening and trust development.	X		

| 8. Use project delivery techniques and tools appropriate to their Data Science project and organisation. Plan, organise and manage resources to successfully run a small Data Science project, achieve organisational goals and enable effective change. | | X | |

Behaviours *The apprentice demonstrates:*	Professional Discussion	Report	Knowledge Test
1. An inquisitive approach: the curiosity to explore new questions, opportunities, data, and techniques; tenacity to improve methods and maximise insights; and relentless creativity in their approach to solutions.	X		
2. Empathy and positive engagement to enable working and collaborating in multi-disciplinary teams, championing and highlighting ethics and diversity in data work.	X		
3. Adaptability and dynamism when responding to varied tasks and organisational timescales, and pragmatism in the face of real-world scenarios.	X		
4. Consideration of problems in the context of organisation goals.	X	X	
5. An impartial, scientific, hypothesis-driven approach to work, rigorous data analysis methods, and integrity in presenting data and conclusions in a truthful and appropriate manner.		X	
6. A commitment to keeping up to date with current thinking and maintaining personal development. Including collaborating with the data science community.	X		