Data Science Degree Apprenticeship Level 6 BSc (Hons) Data Science

Student Handbook 2023-25

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Welcome

Welcome to the course!

Welcome to Data Science Degree Apprenticeship Level 6 BSc (Hons) Data Science. Whether you are starting or continuing your learning journey with us, we wish you every success.

Our aim is to improve your career prospects and to help you bring added value to your organisation.

This course has been designed by Exeter College and the University of Exeter in a partnership brought together by the 'South West Institute of Technology' and we would like to thank all of those involved from these organisations, for their continued involvement.

This course is continuously developing, with feedback from students and employers. It is also a field of evolving technologies! We are grateful for any further feedback that you may send us in any form, to help us improve the course.

Learning is a lifelong activity, and new courses are usually the start of new and exciting chapters in our students' lives – we are looking forward to seeing where this takes you.

Larisa Seward
Program manager

Programme Overview

The programme consists of 3 stages spanning three and a half years. At each stage you will complete 120 credits towards the award of the BSc (Hons) Data Science to ensure you develop the core knowledge, skills, and behaviours expected of a Data Scientist. At each stage you will also make progress on creating a portfolio of work demonstrating the application of your developing Data Science skills in your workplace, culminating in the final assessment of the apprenticeship side of the qualification through completion of the final degree module during stage 3.

Modules build on prior learning from equivalent courses to the computing and statistics content in A-level Maths. We appreciate that many of our learners have existing careers and have not studied for a formal qualification in some time, so each new topic is prefaced with a reminder of presumed prior knowledge to help you hit the ground running.

The programme is delivered at Exeter College in 1 day per week during Exeter College term time at the Digital and Data Centre. Teaching is delivered in small groups of up to 18 learners with high quality interactive sessions and a blended learning format with work-based learning elements embedded throughout.
There will be a range of assessment types such as coursework, presentations, portfolio development, and exams. In a typical year, we also host a range of extra-curricular activities and visiting speakers. Once you are on the course you will take part in an induction day at both Exeter College and the University of Exeter, where you will be granted access to facilities and services from both providers.

The nature of apprenticeships requires you to complete 20% of your time in the role as "*off the job training*" and your College days will make a big contribution towards this requirement. Your training on programme will be supplemented by training and development opportunities provided by your employer. You will have the support of your course tutors and skills officer throughout the course to ensure you are making good progress and to advise on the application of newly acquired knowledge in your workplace, they will also be happy to signpost you to our other services if they are not able to help you themselves.

Following successful completion of the BSc Data Science course you are encouraged to continue your development through the Level 7 MSc Data Research Scientist delivered by the University of Exeter. Ask for details!

Team & Timetable

The following list identifies the key staff who will be involved in the delivery of your programme. You will be introduced to these staff during your induction process; however, it is helpful to have their contact details to hand should you have any queries, prior to enrolment or in the early weeks of your programme. You can find full details of the Modules/Units that they deliver by referring to the Programme Specifications and Programme Quality Handbooks on the relevant course pages of the University Level section of the College website www.exe-coll.ac.uk

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Your timetable will consist of 1 day per week in College during term time, with further time for independent study outside of College to reach a minimum of 20% "*Off The Job*" training.

You will study specified modules on your College day throughout the first 5 half terms of the academic year (according to the Exeter College term dates). The final half term of the year is dedicated to supporting further development of your apprenticeship portfolio of evidence prior to you continuing independently over the Summer break.

It is ESSENTIAL that you build a log or diary of your activities. This will provide a useful record of your achievements and an invaluable treasure trove of information, which will help you with your "*End Point Assessment*". Additionally, we recommend that you start to build a GitHub portfolio, as a measure of your professional development.

A typical College day:

- Taught module A: 09.00-10.30 and 10.45-12.15
- Lunch: 12.15-13.15
- Taught module B: 13.15-14.45 and 15.00-16.30

Academic Calendar

Exeter College term dates for this academic year and subsequent years can be found on our website www.exe-coll.ac.uk – term dates

L6 Data Science Calendar 2023-2024 - Year 3 - Thursdays

Term 1:

- Third Year Induction Day – Thursday 14th September 2023
- Year 3 Teaching Commences – Thursday 14th September 2023
- Wednesday 20th and Thursday 21st September 2023
    - Digital and Data staff will be attending Big Data London. If you also plan to attend Big Data London, please let us know.
- Half Term – No Lessons:
    - Monday 23rd October 2023 to Friday 27th October 2023
- Last Day of Autumn Term (Christmas Closure) – Friday 16th December 2023

Term 2:

- Start of Term/Year 2 Teaching Continues: Thursday 11th January 2024
- Half Term Break – No Lessons:
    - Monday 12th to Friday 16th February 2024
- Easter Break – No Lessons:
    - Friday 29th March to Friday 13th April 2024
- Year 2 Teaching Continues – Monday 18th April 2024
- Half Term - No Lessons:
    - Monday 27th May 2024 to Friday 31st May 2024
- End of Term 2: 10th June 2024
- Last day of the Academic Year: 28th June 2024

TBC: EPA Gateway - dates to be confirmed with the EPAO. This is expected to be around May 2024.

Programme Specifications Structure

	Sept / Oct / Nov / Dec / Jan	Jan / Feb / Mar / Apr / May	May / Jun / Jul / Aug
Year One	EXE1001 – 30 credits Introduction to Probability, Statistics and Data Science	EXE1003 – 30 credits Introduction to Programming and Machine Learning	Portfolio Support and Development
	EXE1002 – 30 credits Introduction to Databases, Data Sources and Ethics	EXE1004 – 30 credits Reflective Practice, Core Mathematics and Work Based Projects	Portfolio Support and Development
Year Two			
	EXE2002 – 30 credits Statistical Tools and Modelling	EXE2003 – 30 credits Software Development	Portfolio Support and Development
	EXE2001 – 15 credits Big Data and Data Science Ethics	EXE2004 – 45 credits Reflective Practice and Group Projects	
Year Three			
	EXE3001 – 30 credits Advanced Data Applications and Data Visualisation	EXE3003 Reflective Practice: Portfolio Support and Development	EXE3003: Gateway
	EXE3002 – 30 credits Advanced Statistics Modelling, Machine Learning, AI and Data Science Ethics		
Year Four			
	EXE3003 – 60 credits Reflective Practice: End Point Assessment		

Further details about the L6 Data Science apprenticeship standard and assessment plan as outlined by the Institute for Apprenticeships and Technical Education (IfATE) can be found on the following websites.

- Data scientist (integrated degree) / Institute for Apprenticeships and Technical Education
- st0585_data-scientist-integrated-degree_l6_ap-forpublication_230718.pdf (instituteforapprenticeships.org) These detail the Knowledge, Skills, and Behaviours you are expected to develop as part of the programme.

Admissions Criteria

Required Qualification		Required subjects' grades
GCE AL		Maths grade B in Mathematics, Pure Mathematics or Further Mathematics
A-Level	AAA-AAB	
IB	36/666-34/665	IB Maths HL5
BTEC	DDD	Applicants studying a BTEC Extended Diploma will also require GCE AL Maths grade B
GCSE	C or 4	English Language
Contextual Offer	See Section below	

A-level Maths B (or Pure Maths or Further Maths, IB HL5)* - OR Level 4 Data Analytics pass.

AND - GCSE English C/4

Apprenticeship requirement:
Level 2 Functional Skills English in place of GCSE is acceptable.

The programme specification contains the admissions criteria for the programme; the aims of the programme and the programme learning outcomes grouped as Knowledge & Understanding; Cognitive and Intellectual skills; Key & Transferable skills; Practical & Employment-Related skills. These are then benchmarked against the relevant QAA subject benchmark(s) and the Framework for Higher Education Qualifications (FHEQ) and mapped to show the Primary and Secondary Teaching Strategy/Methods and Method of Assessment.

The module outcomes of the Core modules in the BSc are mapped to the programme intended learning outcomes (ILOs) at Intermediate Level (FHEQ). They are also mapped to show how the ILOs feed into the programme aims and which set of benchmarks apply.

The University of Exeter awards the Level 6 Data Scientist Degree Apprenticeship (BSc Data Science) at Pass, Merit or Distinction level, with Distinction being granted the standing of high honours.

University of Exeter Information – Key Information For Getting Started

The University of Exeter is the validator of the Honours Degree for the Level 6 Data Scientist Degree Apprenticeship BSc (Hons) Data Science. The University is responsible for monitoring academic standards on the course and student welfare. An academic liaison (A.L) is appointed by the University to carry out these functions. Our academic liaison is Associate Professor Mark Kelson. The
A.L visits the college regularly and attends two course committee meetings each year. Student representatives will be invited to meet Associate Professor Kelson on these occasions to feedback student comment on the course provision.

Activate your University I.T Account before this programme starts to ensure you are able to access the University's online systems such as ELE (Virtual Learning Environment), Library, SRS (Student Record System), iExeter

Complete online registration To be completed by Exeter College.
Once you have received your offer from Exeter College and accepted it, you will be sent an email from the University of Exeter which you need to complete in order to activate your IT account and enrol as a University of Exeter student.

Register for your Student UniCard
Once you have activated your IT account and enrolled, you will be able to apply for your University card. Once you have applied, you will be issued your University card usually during your first on campus session. Your Student Card is to be used as your ID throughout your studies. Please make sure that you carry it with you at ALL times when you are on campus as it is used to access the library, online resources and access to some buildings. If you lose your card, please contact the **Student Information Desk (SID)**: email: or call 0300 555 0444.

For any general queries about University study, e.g. IT account password, lost property, printing, please contact the **Student Information Desk (SID)**: email: **sid@exeter.ac.uk** or call 0300 555 0444. If you are having IT issues, please first check with your employer to establish if their firewall, etc. is responsible then contact the SID desk.

Student ID number Your Student ID number (9 digit number) can be found on your Student Unicard. It can also be found on all official University communications such as your Admissions Welcome email. Please make note of this number.

Student Candidate number Your candidate number is assigned by the University on an academic year basis and can be found on the SRS (Student Record System which can also be accessed via iExeter This number is utilised primarily when sitting exams. Please check for your new number at the beginning of each year.

Pre-arrival Library Guide

The University Library is based in the Forum. The Pre-arrival Library Guide provides a brief introduction to library services and how they can help you during your time at the University. This includes an introduction to the range of academic resources and how you can access materials and specialist support for your subject area.

Further details, including opening hours and access to online resources can be found here: http://as.exeter.ac.uk/library/

Library Induction https://libguides.exeter.ac.uk/libraryinduction Your registration with the University of Exeter entitles you to use the University library, withdraw books for study and have full use of online resources. Access to the library is through the Forum at the centre of the University's Streatham Campus, Main Building, Stocker Road, Exeter EX4 4PT It is advisable to complete the Library's Induction before you begin your studies, but you will be able to access this induction at any point during the programme.

Introductory Tour For DSDA students, you will be invited to the University of Exeter campus for an introductory Tour where you will have the opportunity to join the Student Guild and participate in a wide range of societies and clubs.

University of Exeter Campus Map and Virtual Tour

https://www.exeter.ac.uk/media/universityofexeter/webteam/shared/pdfs/maps/Streatham_Campus_Map_A3.pdf https://virtualtourcompany.co.uk/exeter_university/

University of Exeter extra-curricular events

The University of Exeter Institute for Data Science and Artificial Intelligence (IDSAI) provides a hub for data-intensive science and AI activity within the University and wider region.

The institute holds a series of events throughout the year to which apprentices on the L6 Data Scientist Degree Apprenticeship are invited to attend. A full events listing can be found at https://www.exeter.ac.uk/research/idsai/events/

Studying at Degree Level

Study Zone – university support to upskill to degree level writing.
https://www.exeter.ac.uk/students/studyzone/
Study Zone Digital
https://universityofexeteruk.sharepoint.com/sites/Study Zone
Forum Study Zone
https://www.exeter.ac.uk/students/studyzone/aboutstudyzone/drop-ins/-1appointments/#tab3

Teaching Quality Assurance Manual (TQA)

https://as.exeter.ac.uk/academic-policy-standards/tqa-manual/

Your Degree Apprenticeship Study Q&A

Q: Are lectures compulsory?
You will need to participate fully in your programme. This will include attending and taking part in teaching, learning and/or research events included in your programme, meeting regularly with your programme and/or supervisory team as appropriate, making proper use of all resources available, and preparing and submitting assessed work on time. Further information is available http://www.exe-
https://adexecollacuk.sharepoint.com/sites/AdultLearning

Q: What is the difference between the work I did on the Level 4 Data Analyst programme and the work expected of me as a degree student?
You may find there is a difference in the level of understanding, analysis and evaluation of material and arguments and depth of reading that is required of you. You could ask a member of staff to talk to you about the possible differences.

Q: Will I need to sit formal exams? If so, where can I find examples and help? You will need to sit exams. Our electronic teaching resources on Teams, OneNote, and Moodle will hold examples of sample or past papers and lecturers will explain what is expected of you in exams.

If you need specific support for examinations, programme managers can apply for access arrangements in the usual way, but please do so as soon as possible to enable the Exams Office to put the appropriate arrangements in place.
Please contact CarmenDix@exe-coll.ac.uk, HE DSA Adviser for information and guidance on exam support.

Q: At degree level do I need to know how to reference in a particular way. Where can I find out what referencing system is used by University of Exeter? The student handbook and university website will provide details on the referencing system used. There will be a key skills handout in the library with samples that you can look at. It will be the Harvard referencing system that you are used to using on your DSDA. The University of Exeter uses APA which is similar to Harvard.

You can find more information here:
An introduction to referencing - Referencing - LibGuides at University of Exeter Referencing and Plagiarism - Exeter College

Specific details on the use of generative AI can be found here: 12 - Academic conduct and practice - Teaching Quality Assurance Manual - University of Exeter and how to reference generative AI tools can be found here: Using generative Artificial Intelligence (AI) tools such as ChatGPT in academic work - Referencing - LibGuides at University of Exeter

Important Things To Do:

- Read your Student Handbook. Follow each module using our online resources on Teams, OneNote (ClassNotebook), Moodle, and Sharepoint.
- Attend Induction and do everything you can to understand how things work – this will make your life easier once your programme starts.
- Attend lectures, you will benefit, particularly if you reflect afterwards on what was said, what you understand and what you did not understand.
- Even if you are given lecture handouts, you will find taking your own notes helpful to your concentration.
- Attend and participate fully in your reviews with your skills officer and line manager to check your progress and discuss opportunities to continue to develop.
- Make the most of training opportunities within your organisation.
- Time manage your workload and submission research and planning.
- Know where to hand in coursework using Turnitin on Moodle.
- Submit coursework on time with full referencing.
- Ensure you understand the 'Extenuating/ Mitigating Circumstances' procedure should you need it. Speak to the HE Department for any queries: HEOffice@exe-coll.ac.uk
- Ask for help if you feel you need it. Speak to your skills officer about academic support.
- Mental health and counselling services are available at Greystone House, at Hele Road or speak with the HE Disability Advisor for further assistance. Adult Learners (sharepoint.com)
- Find a peer or group to share ideas and work collaboratively with and discuss Data Science.
- Find out more about the bibliographical referencing system you need to use and how much referencing is expected in each piece of work at this level. Speak to your tutor https://libguides.exeter.ac.uk/referencing
- Do use reading lists and add to them.

20% Off-The-Job-Training

All Off-the-Job (OTJ) training received by an apprentice, must take place during your normal paid working hours, for the purpose of achieving your apprenticeship, which must relate to the Initial Learning Outcomes (ILO's) required in the apprenticeship standard.

It can include training that is delivered at the apprentice's normal place of work and can include the following.

- The teaching of theory (e.g., lectures, role playing, online learning, manufacturer training)
- Practical training, shadowing, mentoring, industry visits, attendance at competitions
- Learning support and time spent writing assessments/assignments.

Off-The-job training does not include.

- training to acquire knowledge, skills and behaviours that are not required in the standard or framework.
- progress reviews or on-programme assessment required for an apprenticeship framework or standard.
- training which takes place outside the apprentice's paid hours.

At least 20% of the apprentice's paid hours, over the planned duration of the apprenticeship, must be spent on Off-The-Job training. Evidence must be available to support the training delivered. Details on how your 20% off the job requirement is calculated and included in your Commitment Statement.

In instances of authorised absence, you should still be given your "*off the job training*" time to work through the relevant catch-up materials during working hours. To pass the Apprenticeship, the 20% Off-The-Job time is sufficient. If an apprentice wishes to raise their level of understanding and potential to achieve a higher grade in the degree, they are encouraged to undertake additional study in their own time, but this should not be recorded as Off the Job. If you wish to record this learning in your OneFile portfolio (if applicable) as part of your Learning Journal, ensure you **do not tick** the Off the Job box. Always check this box is ticked against those activities undertaken at work/during working hours.

Reading Lists The recommended textbooks for each module are displayed on the module descriptors. These are used to varying degrees within the modules taught content, but you may wish to refer to these as a starting point for any additional research or reading you wish to undertake. These are not mandatory but will enhance your learning. If any materials are included in the exam the Lecturer will advise you. Many of the textbooks are available as eBooks in the University library system: https://vle.exeter.ac.uk/

Helping You Succeed

Do not suffer in silence! Remember support is available to you throughout your apprenticeship from Exeter College and your employer:

- Talk to your skills officer, lecturer or contact your programme manager.
- There are many sources of **support and help** available at the University.
- Whether you are experiencing illness, injury, depression, anxiety, disability, financial difficulties, emotional trauma, or anything else, there is always someone who can help.
- Please first discuss with your skills officer or lecturer and they will assist you with the mitigation process.

For guidance and advice on how to apply for **mitigation** using the online form, please visit the university's **Welfare webpage**. To apply for mitigation, you need to complete the form on the college's welfare web page which contains useful information about our welfare policies and procedures, as well as full guidance on the mitigation process. Be sure to read the guidance carefully before submitting a form.

It is useful to also email the Programme Manager for information or support on this process, but requests will only be considered when the online form is completed and supported by evidence, such as a doctor's note or signed statement from your employer. You may also want to discuss mitigating circumstances with your skills officer who can point out any support facilities available.

You must also contact your skills officer if you are unable to submit coursework or attend an exam. The Mitigation Form should be submitted no later than one working day after your deadline. Please note that applications for mitigation will not be considered until supporting evidence is provided.

Supporting evidence must be provided no later than 10 working days of the assessment deadline. We aim to acknowledge all mitigation claims in a timely manner.

As apprenticeships are defined as study alongside a full-time job, the demands of your job will be considered alongside assessment submission. However, your day-to-day work commitments should be prepared for and factored into your time management for assessments. We will provide you and your employer with assessment dates in advance so employers can plan workloads/ highlight any clashes before submission.

By submitting an application for mitigation, you are **agreeing** that the decision made by the committee is **final** and should your application be successful, you must abide by the recommended outcome (either a deferral or extension).
There will be no opportunity to change your mind and reject the committee's decision, at no point will you get the opportunity to review or reinstate any mark you have received for the current assessment, so think carefully about whether this is what you want.

Deferrals: A deferred assessment is when you take a second or later attempt at an assessment, but it is treated as your first attempt. Deferrals can be made for both coursework and exams. Read more information about **deferrals here**.

Extensions: Please note that coursework extensions are granted for a maximum of one week, unless further evidence is supplied. Please also be aware that if we do not receive your supporting evidence within 10 working days of the original assessment deadline, late submissions will be capped at the pass mark.

Reporting Absence: Attendance is mandatory, but if you are going to miss a class because of illness or another legitimate reason, you will need to report your absence to the Module Lecturer leading the session **and** your Skills Officer along with the Programme Manager (who tracks attendance as part of the government funding requirements). Please detail the relevant sessions/classes you are going to miss and submit your reasons for being absent:

- Illness
- Personal or family emergency
- Careers or personal development related such as an interview.

If your reason does not fall under the categories above, then it is unlikely we will be able to approve your absences. You may be required to provide evidence of your circumstances. If you are unable to do so your request may be refused. If your request is refused you will be marked absent without permission for this session. You can give a reason for your absence in advance, or up to one week after the missed class. If you are taking part in group work for your modules make sure you inform your fellow group members if you are going to miss any sessions.

While attendance is vital for every session, it is even more crucial during the on-campus sessions due to their intensity. One day teaching could cover 3 or 4 sessions for a module. The teaching dates will be released as soon as they become available.

Annual Leave

Your employer will explain their annual leave allowance and policy when you begin employment. We cannot prevent you from taking Annual
Leave at any particular time, however, we ask you to be mindful of the above attendance policy. Annual leave is not a reason for missing assignments or weekly online learning, and this must be caught up within your working hours.

Changing Circumstances

The college and your employer are committed to supporting you to complete the apprenticeship, but we appreciate that circumstances can change. Sometimes students face a period of prolonged illness, or personal crisis, which means that they cannot study effectively. In all cases, we strongly advise you to speak to your skills officer or lecturer in the first instance.

Break In Learning

If you are unable to work/study e.g., due to maternity/paternity leave, illness, secondment opportunity, you can apply to take a break from your studies for a period of one month up to one academic year. Your employer should be informed and support the break. You should discuss your specific situation with your skills officer or lecturer, and they will help guide you through the process.

Please carefully read the **Interruption of Studies Information**. You will need to talk to your skills officer in the first instance, and then confirm your decision to take a break in learning with them via email.

Once you have done this your skills officer will then submit the required forms for approval via the College and University processes. Once the form is processed, you will lose access to all university resources, except your e-mail account.

Shortly before your expected return date, you will be contacted via your Exeter College email address to confirm you will be returning. We ask that you also confirm this with your skills officer, so we can plan any additional support measures.

The Exeter College Business Solutions team is informed an apprentice is taking a break in learning, usually by the skills officer or lecturer who will guide you through the Exeter College process.

The skills officer will signpost you to the information about BIL (Break In Learning) which is found on SID. There is a form here you will need to complete and submit in SID so the Degree Apprenticeship Hub can check and process your information.

Change Of Employment

Both Exeter College and your employer are committed to supporting you through changing circumstances and will discuss these options with you as and when required.

Withdrawals

If you have no wish to continue with the programme, you can withdraw. Again, you should discuss with your skills officer and employer as a withdrawal may affect your employment status. You will need to withdraw from both Exeter College and Exeter University and may be invited to attend an exit interview.

Please carefully read the **details of withdrawal.** You will need to talk to your skills officer in the first instance, and then confirm your decision to take a break in learning with them via email.

Once you have done this your skills officer will then submit the required forms for approval via the College and University processes. Once the form is processed, you will lose access to all university resources, except your e-mail account.

When completing either of these forms, please ensure you confirm the last day in learning as the last day you took part in learning activity, including coursework, e-learning as well as face-to-face teaching, as this is used to calculate funding between the University and your Employer.

General Exeter College Information and Guidance

Orange and Green Lanyards

These must be worn at all times on College premises. These denote HE student status and will give access to HE facilities across the College.

College ID card

You must have a valid College ID card for borrowing resources. This card can be obtained from the Learning Centre, once your enrolment details are on the MIS database. This card shows your College email address, user ID and initial password for using computers. You will also be issued with Exeter University student cards allowing you access to a wide range of texts, journals and digital resources from industry and academic sources nationally and internationally.

Evaluation

1. Student comment is welcomed, and a review process has been set up which allows students to influence the development of the course. Students have the following opportunities to make their views known:

- regular review meetings with their Skills Officer
- induction review - via questionnaire
- Mid module and end of module student reviews
- twice-yearly course committee meetings attended by lecturing staff, student representatives and University course Validator
- private discussion between course Validator and course representatives (following committee meetings)
- meetings of group student representative with Head of HE and Vice Principal
- course end review - via questionnaire.

Student comment is collated and considered in the development of the Programme team Action Plan.

2. Reports on the course are made each year by the External Examiner and the University course Validator. Recommendations made are referred to the course team and included in the course team Action Plan.
3. The course is regularly reviewed by the University of Exeter.

Learning Resources

Computing facilities

There are networked computers in the Digital and Data Centre and Hele Building Study Centre which can be used at any time during opening hours unless previously booked. You may book one of the open access computers accessed through the College hub pages. On the computers you will find Microsoft Office applications, Outlook, the College Portal, access to the Internet and a variety of other software.

There is a printer/copier in the Centre. Credits can be added to your account, using the credit loader in the Centre, before sending work to the printer or making photocopies.

Further information

More detailed information about the facilities in Hele Building Learning Centre can be found in guides and help-sheets or from the members of staff who work there. All staff are well qualified and always willing to provide assistance when required.

Research skills

The Exeter College Learning Centres provide access to induction sessions and Advanced Skills Sessions where you can access advice on researching, evaluating sources and using the online resources available through the Portal, but please ask at any time if you need help finding information.

Students are welcome to use the machines in teaching rooms if no lecture is taking place but are reminded to observe both Health & Safety and the Internet usage policy (posted in rooms).

Virus Problems

Please note that any member of staff does not regard loss of coursework through loss or corruption as sufficient extenuating circumstances for late work. Students are expected to have suitable virus and back-up procedures in place.

Equality and Diversity

Exeter College is committed to the principles of equality and diversity for all its staff and learners and actively challenges any unlawful discrimination on the grounds of age, disability, gender, gender reassignment, pregnancy, and maternity, marital or civil partnership status, race, religion or belief or none, and sexual orientation. The values of equality and diversity underpin all our courses. We promote positive attitudes towards diversity, encourage all learners and staff to reach their full potential and take proactive steps to take account of the additional needs of those people who may experience the greatest barriers to fulfilling their potential.

This Policy Statement applies to all stages of the Higher Education student life cycle.

Disability Support

The DSA Supervisor/Advisor can help, advise, or guide you with any disability or support related issue. This could be applying for individual exam arrangements, or additional support via Disabled Students Allowance (DSA). DSA provides funding to cover the cost of additional support for students with mental health conditions; physical health conditions; learning difficulties and sensory impairments which may impact on their studies.

At Exeter College we encourage students to engage with us so we can meet individual student needs effectively and in a timely manner.

So, if you have any disability related concerns or questions, please contact the DSA Supervisor/Advisor at your earliest opportunity

01392 400443 or mobile: 07879 113062 By email: dsa@exe-coll.ac.uk

For more information, please follow the link below;
https://adexecollacuk.sharepoint.com/sites/AdultLearning

References, Plagiarism and Academic Offences

This is a very important issue, and you need to read this next section very thoroughly.

Plagiarism can be defined as the deliberate use of another person's work in your own work, as if it were your own, without adequate acknowledgement of the original source. If this is done in work that you submit for assessment, then you are attempting to mislead the person marking your work. In other words, plagiarism is cheating - trying to claim the credit for something that is not your work.

This is a serious offence because it threatens to undermine the value of a qualification. We take it very seriously and will impose severe penalties on students who are found guilty of plagiarism.

In Exeter College, we use a wide range of methods to detect possible plagiarism, including electronic methods. The Turnitin system detects similarities and frequencies of words or phrases. We also change our assessments every year, to ensure that work is not copied from earlier years. Ensure that references have been properly acknowledged using the Harvard or APA referencing system. The Turnitin system on Moodle must be used to electronically submit all assignments.

Penalties Imposed

- In any case of plagiarism, where the work of one student is used by another in an attempt to deceive the examiners, both the student who does the copying and the person whose work is copied will receive **ZERO MARKS/GRADE** for that item of assessment.

- Similarly, any submitted work that contains unacknowledged blocks of text from published works (including web-based sources) in an attempt to deceive will receive **ZERO MARKS/GRADE.**

- In all cases above, we will ask the departmental administrator to record the act of plagiarism **permanently** on the student's academic record.

Further information is available on the HE Hub-Plagiarism section.

Plagiarism and Generative AI

Specific details on the use of generative AI can be found here: 12 - Academic conduct and practice - Teaching Quality Assurance Manual - University of Exeter and how to reference generative AI tools can be found here: Using generative Artificial Intelligence (AI) tools such as ChatGPT in academic work - Referencing - LibGuides at University of Exeter

Compliments, Comments & Complaints Procedure

Exeter College welcomes feedback on all aspects of our provision and service. We do not pretend to be perfect, and we would like to encourage all stakeholders to tell us what we can do better. Compliments and constructive criticism help us to improve the quality of all that we do. We want to resolve issues that you bring to our attention as formal complaints. All courses and services at Exeter College are reviewed regularly and your comments will help us to prepare and, when necessary, redesign or change the provision and support services.

Compliments and Comments

- We would like to know what you think we do well. Positive feedback will help us to carry on doing what you think we are doing well.
- If you are a student or an employer of a student and you would like to acknowledge the support that you or your employee has received while at the college, please let us know.

- You can either contact the member of staff involved directly or contact your/their skills officer. They will ensure that your feedback reaches the relevant person and that the Senior Leadership Team is made aware.

Academic Appeals and Complaints

- We are committed to excellence in all areas of our provision. If we make a mistake, we would like to know about it so that we can put things right. If you are a student or employer or a member of the wider community, please help us to resolve issues and disagreements informally without reference to a member of the Senior Leadership Team or the Quality and Compliance Manager. If this is not possible, please use the formal complaints procedure described below and put your complaint in writing.

- At Exeter College all staff have a responsibility to listen and to respond to constructive criticism. All complainants will be treated fairly and equally. If you make a complaint in writing, you will receive a clear response from us.

- It is important that both the complainant and the College remain professional throughout. Exeter College has a duty of care to its students and staff, and if the behaviour of a complainant is insulting or aggressive during a phone conversation or a meeting, the College reserves the right to terminate the complaint process. The same applies if written correspondence received by the College has threatening tone or is rude.

- Complaints should first be raised with your programme manager. If you are dissatisfied or wish you may go directly to raise a formal complaint, in writing to the student engagement officer who will provide the correct forms and guidance. HEOffice@exe-coll.ac.uk. Full details of the procedure can be found on the HE Hub.

- Following a Board of Examiners your final result will be confirmed to you in writing. There may be occasions when you believe that you have been unfairly treated and, in this situation, you may have the right to make a formal appeal to the college. If you believe you have grounds for appeal, please contact the HE Department: HEOffice@exe-coll.ac.uk

- All complaints and appeals will be treated in strictest confidence. Please note that at any stage of the complaints or appeals procedure you are entitled to be accompanied by a person of your choosing.

    - You also have full opportunity to raise matters of concern on academic matters throughout your time at the college without fear of disadvantage and in the knowledge that your privacy and confidentiality will be respected. Your tutor will be able to advise you on where you can obtain impartial help, advice, guidance and support.

Teaching, Learning and Performance

Verbal Complaints

- Wherever possible we try to settle verbal complaints informally. All members of staff have a responsibility to take action to resolve a complaint as soon as possible, wherever possible.
- The member of staff listening to the complaint will complete a Verbal Complaint Record Form and pass it to the Head of Faculty or Head of Department. They will then try to resolve the matter together with the person who is complaining.
- If a verbal complaint cannot be resolved easily, the Head of Faculty/Department will support the process.
- The Head of Faculty or Department will keep the details of the verbal complaint and the outcome on record, including a copy of the Verbal Complaint Record Form. We will keep all documentation relating to a verbal complaint for three years.

Written Complaints

If you wish to make a complaint in writing this is what you should do:

- Send your written complaint to us by letter or e-mail. You can also use the Written Complaint Form, which is attached to this document. This Procedure and the Complaint Forms can be found on the College Website under "contact us".
- Please address letters of complaint to "Quality and Compliance Manager, Exeter College, Hele Road, Exeter, EX4 4JS".
- Please send email messages to info@exe-coll.ac.uk
- It is helpful to us if you note down the facts as you see them and describe what you would like to happen as a result of your complaint.

What happens when we receive your complaint?

- The Quality and Compliance Manager will receive your letter or email.
- We will acknowledge your complaint within 5 working days of receiving it, either by letter or email. Please let us know your preference.
- We will log your complaint and send a copy to the member of the College Leadership Team who will be investigating. Depending on the nature of the complaint, meetings or telephone conversations may be needed to establish exactly what happened. We may contact you again for further information.
- We will send you a written response to your complaint within 20 working days, unless there are exceptional circumstances or the complaint was received at the beginning of, or during a holiday period. The response will describe the outcome of our investigation and any action that we will take because of your complaint.

Teaching, Learning and Performance

All paperwork relating to a written complaint will be retained for three years. The quality and compliance manager monitors the complaints and writes a report for the Governing Body.

What happens if you are not satisfied with our response to your complaint?

If the complaint is not resolved to your satisfaction, you should write to us again within 5 working days of receiving our response, using the same way of contacting us as described previously.

What will happen?

- Your complaint will be passed to a director, assistant principal, or vice principal.
- They will investigate the complaint again and respond within 20 working days of receiving your further correspondence unless there are exceptional circumstances. If a complaint is made just before or during a period of holiday time, the response may take longer, because if staff are on leave an investigation may take longer.
- If the complaint is still not resolved to your satisfaction, you can refer the matter in writing to "The Principal, Hele Road, Exeter College, Exeter, EX4 4JS". This should happen within 5 working days of receiving the written response from the Director, Assistant Principal or Vice Principal. The decision of the Principal is final.

What do you need to do if you want to complain about the Principal, Vice Principal or the Clerk to the Corporation?

- If your complaint relates to the professional behaviour of the principal, or a vice principal you should write directly to the "Clerk to the Board, Hele Road, Exeter College, Exeter, EX4 4JS".
- If your complaint is in relation to the clerk, you should write to the "Chair of the Board, Hele Road, Exeter College, Exeter, EX4 4JS".
- Timescales and procedure of response will follow as closely as possible the ones described previously.

Verbal Complaint Record Form

To be completed by member of staff receiving the complaint

Name of Complainant: Address: Telephone No:

Details of Complaint: Signature:

Name (Block capitals)

Name of staff receiving complaint? Action taken to address complaint:

Was the complainant satisfied? Signature of staff dealing with complaint: Name: (Block capitals)

***Copy sent to**: Head of Faculty/ Department*
Teaching, Learning and Performance August 2020 Page 4 of 5

Yes/No

Faculty/ Department:

***Copy sent to:** Quality and Compliance Manager*

Date:

Written Complaint Form

Name of Complainant: Home address:

Post Code: Telephone Number:

Have you already tried to resolve this complaint verbally? Yes/No (Please indicate)

By completing this form, you are making a written complaint, which will be investigated by a member of the College Leadership Team and logged by the Quality and Compliance Manager.

Nature of complaint:

(You should include details of date(s), time, place and people involved and highlight exactly why you are making a complaint)

Please continue overleaf if required ☐

Desired outcome: (What would you like to happen as a result of your complaint?)

Signed: Date:

Please return this form to the Quality and Compliance Manager, Exeter College, Hele Road, Exeter EX4 4JS

Academic Appeals and Complaints Procedures
University of Exeter and Exeter College Validated Programmes

For all courses at Exeter College which are validated by the University of Exeter and whereby students are registered as University of Exeter students, the University's academic appeals and formal complaints processes will apply.

Formal Stage

If you have been unable to resolve your complaint informally, you should put your complaint in writing using the University of Exeter's 'Complaint Form – Formal Stage', addressed to the Quality Assurance Manager at Exeter College, stating with whom you attempted to raise the matter informally, the outcome and why you remain dissatisfied.

A formal complaint must be submitted no later than 10 working days after the email concluding the 'informal' stage.

You should expect to receive an acknowledgement within 5 working days of your formal complaint being received.

You will receive a written decision within 30 calendar days of receipt. Students will also be entitled to refer the complaint to 'Review' stage if they remain unsatisfied with the outcome of the formal stage.

Review Stage

If your formal complaint has not been resolved in a way that is satisfactory to you, you should refer your complaint to the University centrally through the Student Cases Office studentcases@exeter.ac.uk within 10 working days of the final response from Exeter College.

The University aims to complete the Review Stage within 60 calendar days of receipt of the complaint.

The University will obtain a copy of the full file from Exeter College and a committee may be convened to take this forward. Full details of the committee protocol; timeframe and procedures can be found on the University of Exeter's website.

If following the committee decision, a student remains unsatisfied with the outcome, they may refer the complaint to the Office of the Independent Adjudicator for consideration if it is eligible under its procedures: www.oiahe.org.uk

Wellbeing, Accessibility and Safeguarding

PREVENT
https://www.exeter.ac.uk/cgr/prevent/

Exeter Speaks Out (bullying, harassment, intimidation, discrimination)
https://www.exeter.ac.uk/about/speakout/

Recreation Sports Centre virtual tour: https://sport.exeter.ac.uk/facilities/virtualtour/

College Policy Information Our Vision, Mission, Values and Policies (execoll.ac.uk)

EXETER COLLEGE POLICY INFORMATION

- College Mission Statement
- Strategic Plan
- Complaints Procedure
- Data Protection
- Disability Equality Scheme
- Drug & Alcohol Misuse
- Ethical Policy
- Gender Equality Scheme
- Health & Safety
- No Smoking Policy
- Plagiarism and Learner Malpractice Policy
- Quality Assurance Policy
- Quality Strategy
- Student Code of Conduct
- Teaching & Learning Policy / Strategy

Please see the HE Hub for policies and procedures for your programme.

Health & Safety: General Points

Exeter College Safety Policy requires you to observe all health and safety rules.

Students are responsible for:

- Co-operating and maintaining a tidy and safe working environment
- Observing college health & safety rules and regulations
- Using in a safe manner & not wilfully misusing, neglecting, damaging, or interfering with apparatus, equipment, college premises or services.
- Reporting any hazard, dangerous equipment, or service to the Lecturer in charge of their class or to any other member of the college staff.
- Reporting an accident immediately to the Lecturer in charge of their class.
- Observing the college no smoking policy.
- Please observe all signs, information and guidance regarding social distancing and reporting on covid related issues.

First Aid Contact the college nurse at Greystone House telephone: 01392 400445. If a nurse is not available, contact a first aider as shown on the notice board. Make sure a member of college staff is informed immediately.

Emergency Evacuations Please read the 'Emergency Evacuation Notices' that are posted around the college and familiarise yourself with your building. It may save your life!

Moving Around the College You are required to wear your orange lanyard and college ID card at all times. If you see any suspicious activity of persons, please report it immediately to one of the security team. Only water is to be consumed in classrooms.

Absences

Please let the college/ your tutor know if you are unable to attend. Please contact the college by 10am.

Please remember that **doctors and other health appointments should be made outside your College timetable, as should driving lessons. Holidays may not be taken during college term time.**

Complaints Procedure All complaints will be treated fairly and equally. Exeter College is committed to high quality in all areas of our provision. We encourage everybody to make constructive suggestions, criticisms and compliments. All Exeter College staff have a responsibility to listen and respond to constructive criticism. See above.

Financial Regulations you should be aware of

Where you have an outstanding financial obligation, including the non- return of books and equipment, the University /College may:

- Defer the marking of examination scripts or any assignments.
- Defer consideration of your performance.
- Withhold a Board of Examiners' decision.
- Withhold an award (hence you may not be able to graduate until any debt is discharged).

Handing in Assignments

You will be set a specific deadline date and time during which your assignment should be handed in "on time". Assignments must be submitted via Moodle

Plagiarism. This is the deliberate use of another person's work in your own work, as if it was your own, without proper acknowledgement of the original source.

If this is done in work that you submit for assessment, then you are attempting to mislead the person marking your work. In other words, plagiarism is cheating. This is a serious offence because it threatens to undermine the value of the qualification. The College takes this very seriously and will impose severe penalties on students who are found guilty of plagiarism.

If you would like to see the full policy on plagiarism, please ask your tutor or look on the college portal.

Refectory Facilities

Sandwiches, snacks, and hot and cold drinks are available throughout the day from our college refectories. Food and drink, other than bottled water, are not allowed in the classrooms, workshops, and college property generally, other than in the designated areas.

Smoking

Smoking is not permitted in any part of the college's premises or on any of the college grounds at any time in compliance with the Health Act 2006.

Security

Student lockers cannot be provided because of lack of space. Students are responsible for the security of their personal possessions. Lost property can be collected from the Security offices at each site.

Student Code of Conduct

Exeter College has a Higher Education Student Code of Conduct which you be asked to sign during your induction week. This states the college's commitments to you as a student and the expectations it has from you as a learner.

Vehicle Parking

There is no parking for students on most college sites, except for disabled students with a 'Blue Badge'. However, you may park in the designated 'Pay & Display' car parks adjacent to the various college facilities at certain times, please see notices.

You must not park motorcycles or bicycles except in authorised places. Please make sure they are locked securely, preferably with a D-type lock. You must not create dangerous situations by careless parking or create an obstruction, especially of fire exits / routes or walkways.

Vehicles illegally parked on college premises will be ticketed or clamped.

Exeter College Learning Centres

Exeter College maintains Learning Centres at the following sites.

- CCI
- Victoria House
- Hele Building
- Falcon House
- A Level Learning Centre (Hele Tower)

Media equipment is available for loan from each learning centre with the widest range being held at the Creative Industry Learning Centre at Queen Street.

Learning Centres have:

- Networked PCs for student use. A Mac suite and TV studio is also available at the Creative Industry Learning Centre.
- Wi-Fi facilities allowing students full network access on their own IT equipment.
- Self-service photocopying and binding services.
- Subject Librarians who have extensive knowledge of resources both available internal and external, in their designated subject areas. They also deliver both introductory and advanced level information skill sessions.

The online library catalogue is available both on and off campus. Students can use the catalogue to renew and reserve items, and media equipment and PCs can be booked via the online booking systems.

Full information on the range of services and resources and how to contact the Learning Centres can be found on the Learning Centre portal pages. DSDA students have unique access to all the services at University of Exeter library including all online, physical and advice services.

Key Contacts

Higher Education Office

Email: heoffice@exe-coll.ac.uk
Provides advice and guidance: extenuating circumstances, academic appeals, financial hardship, accommodation, course information.

IT Support

Advice and support with logging on to computers/ laptops, password, Wi-Fi and file formats. 4th Floor Tower Building Hele Road Site.
Email: Itsupport@exe-coll.ac.uk or ask for help at any Learning Centre.

Learning Support:

Adult Learning Hub IoT Building
Email: dsa@exe-coll.ac.uk

Carmen Dix is the HE DSA Supervisor/Advisor - please contact her with any questions you have about additional support for degree-level study. http://www.exe-coll.ac.uk/HE/Support/Support.aspx
https://adexecollacuk.sharepoint.com/sites/AdultLearning/SitePages/Disability - and-Well- being-Support.aspxt

Apprenticeships Advice and Guidance:

Apprenticeships (exe-coll.ac.uk)

HE Careers Advice and Guidance:

Advice on career planning incl; Progression, Internships, Placements, Graduate job applications and self- employment.

Deborah Kearney HE Office, Ground Floor Hel Road Tower (Fridays)

https://adexecollacuk.sharepoint.com/sites/AdultLearning/SitePages/Disability - and-Well-being-Support.aspx

Exeter College Students Union

ECSU is an organisation run by students for students. Whatever course you choose when you come to Exeter College, you will automatically become a member of the ECSU: Exeter College Student Union.

Finance Office:

1st Floor Tower Building Hele Road site.

Mon to Thursday: 9am to 5pm & Fri:9am to 4.30pm Tel: 0845 1116000 (Reception)

Payment of fees, queries and clarifications. Council tax exemptions.

University of Exeter

MODULE TITLE	Introduction to Probability, Statistics, and Data Science				**CREDIT VALUE**	30
MODULE CODE	EXE1001		**MODULE CONVENOR**	Claire Collis		
DURATION	**TERM**	**1**	**2**		**Number Students Taking Module (anticipated)**	**12**
	WEEKS	15				

DESCRIPTION – summary of the module content

During this module you will be introduced to the role of the Data Scientist and explore what Data Science is, the data lifecycle, and key statistics topics with embedded teaching of the R programming language and Excel. You will have the opportunity to develop your skills further in the reflective practice modules and put this knowledge into practice in your workplace. Statistical topics in this module include 1D and 2D data sets, an introduction to statistics and visualisations, correlation, measures of variation, an introduction to normal distribution, probability and conditional probability, introduction to hypothesis
testing with correlation and T-tests, and an introduction to time series.

MODULE AIMS – intentions of the module

This module will give you an introduction to your role as a Data Scientist. Underpinning knowledge of statistics and probability needed for data analysis is covered in this module as well as your knowledge of the tools needed for the role. This module is a pre-requisite for *EXE1003 Introduction to Programming and Machine Learning*. As part of this module, you will develop a range of knowledge, skills and
behaviours as outlined by the Data Scientist apprenticeship standard and chosen by employers.

INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed) On successful completion of this module **you should be able to**:

Module Specific Skills and Knowledge:	
1	Describe the fundamentals of probability and statistics.
2	Explore data visually.
3	Conduct appropriate analyses of data and interpret them correctly.
Discipline Specific Skills and Knowledge:	
4	Demonstrate an appreciation of the importance of understanding and exploring data before analysing it.
5	Conduct appropriate inference for some types of data.

Personal and Key Transferable/ Employment Skills and Knowledge:	
6	Evaluate the context of Data Science and the Data Science community in relation to statistics.
7	Explain how data can be used systematically, through an awareness of key platforms for data and analysis in an organisation, including: Data-driven decision making and the good use of evidence and analytics in making choices and decisions.
8	Explain how to implement and optimise analytical algorithms using statistical and mathematical models and methods.
9	Show how to implement and optimise analytical algorithms using computing and organisational resource constraints and trade-offs involved in selecting models, algorithms and tools.
10	Describe the data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets, and common patterns in real-world data.

SYLLABUS PLAN – summary of the structure and academic content of the module

- The role of the Data Scientist and the data analytics lifecycle
- Statistics for model building: measures of central tendency and introduction to R
- Statistics for model building: measures of variance and methods in R
- Introduction to probability
- Conditional probability
- Analysing and exploring data with R: single variable visualisation techniques in R
- Analysing and exploring data with R: bivariate visualisation techniques in R
- Properties the normal distribution and handling outliers
- Introduction to hypothesis testing: T-tests
- Correlation and introduction to linear modelling
- The data analytics lifecycle
- Introduction to time series and introduction to forecasting
- Practical applications
- Developing core deliverables

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning and Teaching activities	45	Guided independent study	255	Placement/study abroad	0

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS		
Category	Hours of study time	Description
Scheduled Learning and Teaching	45	Interactive Lectures
Guided Independent Study	255	Work-based learning

ASSESSMENT				
FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade				
Form of Assessment		Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
Homework activities after each session		1 hour each week	All	Oral/Automated/Peer
SUMMATIVE ASSESSMENT (% of credit)				
Coursework	45	Written exams	55	Practical exams 0

DETAILS OF SUMMATIVE ASSESSMENT				
Form of Assessment	% of credit	Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
Written assignment: Data Analytics Lifecycle, Statistics and Probability	15	Approximately 4 pages long	1,3-4, 6-7	Written and Verbal
Written assignment: Tools and Techniques for Data Analysis: Analysing data with R and Hypothesis testing	15	Approximately 4 pages long	2-5, 8-9	Written and Verbal
Written assignment: time series and core deliverables	15	Approximately 4 pages long	2-3, 5, 7, 10	Written and Verbal
Examination	55	90 minutes	All	Exam results sheet

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)			
Original form of assessment	Form of reassessment	ILOs reassessed	Time scale for reassessment
Written assignment: Data Analytics Lifecycle, Statistics and Probability	Written assignment: Data Analytics Lifecycle, Statistics and Probability	1,3-4, 6-7	August resubmission
Written assignment: Tools and Techniques for Data Analysis: Analysing data with R and Hypothesis testing	Written assignment: Tools and Techniques for Data Analysis: Analysing data with R and Hypothesis testing	2-5, 8-9	August resubmission
Written assignment: time series and core deliverables	Written assignment: time series and core deliverables	2-3, 5, 7, 10	August resubmission
Examination	Examination	All	August referral period

RE-ASSESSMENT NOTES

Where you have been referred/deferred for the exam, you will have the opportunity to take a second exam in the August/September re-assessment period.

Deferral – if you miss an assessment for certificated reasons judged acceptable by the Mitigation Committee, you will normally be either deferred in the assessment or an extension may be granted. The mark given for a re-assessment taken as a result of deferral will not be capped and will be treated as it would be if it were your first attempt at the assessment.

Referral – if you have failed the module overall (i.e. a final overall module mark of less than 40%) you will be required to resit the assessment as described in the tables above. The mark given for a re-assessment taken as a result of referral will be capped at 40%.

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type and level of information that you are expected to consult. Further guidance will be provided by the Module Convenor.

Indicative reading:

EMC Education Services (2015). *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*. Wiley.

Goodfellow, I et al. (2016). *Deep Learning*. Massachusetts Institute of Technology Cadle, J et al. (2014). *Business Analysis*. BCS, The Chartered Institute for IT; 3rd edition

Han, J & Kamber, M (2011). *Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems)*. Morgan Kaufmann; 3 edition

Provost, F. & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking.* O'Reilly Media; 1 edition

Golfarelli, M & Rizzi, S (2009). *Data Warehouse Design: Modern Principles and Methodologies*. McGraw-Hill Education

Kimball, R & Caserta, J (2004). *The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming, and Delivering Data*. John Wiley & Sons; 1 edition

Kimball, R et al. (2008). *The Data Warehouse Lifecycle Toolkit*. John Wiley & Sons; 2nd Revised edition

Finlay, S. (2014). *Predictive Analytics, Data Mining and Big Data: Myths, Misconceptions and Methods (Business in the Digital Economy).* Palgrave Macmillan; 2014 edition

Cole Nussbaumer Knaflic (2015). *Storytelling with Data: A Data Visualization Guide for Business Professionals*. John Wiley & Sons; 1 edition

Geron, A. (2019) *Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*. OReilly; 2nd New edition

James, G et al. (2013). *An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics)*. Springer; 2013th edition

Web-based and electronic resources:

Resources will be made available on the Microsoft Team teaching group connected to OneNote with the ClassNotebook add-in.

https://moodle.exe-coll.ac.uk/my/

MyMaths - Bringing maths alive - Home

W3Schools Online Web Tutorials

Learning and Development Services (microsoft.com) https://www.bigbookofr.com

https://r4ds.had.co.nz/

https://bookdown.org/rdpeng/rprogdatascience/

CREDIT VALUE	30	**ECTS VALUE**	15
PRE-REQUISITE MODULES	None		
CO-REQUISITE MODULES	None		
RCF LEVEL	4	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	14/05/2021	**LAST REVISION DATE**	18/05/2021
KEY WORDS SEARCH	Data, Statistics, R, Excel, Probability, Conditional Probability, Bivariate, Normal Distribution, Hypothesis Test, T-test, Correlation, Time Series, Data Analytics Lifecycle, Core Deliverables		

MODULE TITLE	Introduction to Databases, Data Sources, and Ethics				**CREDIT VALUE**	30
MODULE CODE	EXE1002			**MODULE CONVENOR**	Claire Collis	
DURATION	**TERM**	**1**	**2**		**Number Students Taking Module (anticipated)**	**12**
	WEEKS	15				

DESCRIPTION – summary of the module content
This module will introduce you to databases and sources of data, key legislation, and ethical and moral considerations. It will be followed by the reflective practice module giving you the opportunity to put this knowledge into practice in your workplace. Database topics will include an overview of different types of architecture, databases, normalising relational databases, introduction to SQL, and database design.
MODULE AIMS – intentions of the module
This module will give you an introduction to legal and ethical considerations in your role and ensure you have a foundation knowledge of data sources and storage so that this can be retrieved and analysed. This module is a pre-requisite for *EXE1004 Reflective Practice, Core Mathematics, and Work Based Projects* As part of this module, you will develop a range of knowledge, skills and behaviours as outlined by the Data Scientist apprenticeship standard and chosen by employers.
INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed) On successful completion of this module **you should be able to**:

Module Specific Skills and Knowledge:	
1	Recognise different types of database and design
2	Evaluate a how to normalise a relational database
3	Identify the correct SQL expressions for a variety of situations
Discipline Specific Skills and Knowledge:	
4	Examine legal and ethical considerations relating to Data Science
5	Illustrate how legal and ethical considerations apply in specific case studies

Personal and Key Transferable/ Employment Skills and Knowledge:	
6	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.
7	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.)
8	How data can be used systematically, through an awareness of key platforms for data and analysis in an organisation, including: Data processing and storage, including on-premises and cloud technologies.
9	How data can be used systematically, through an awareness of key platforms for data and analysis in an organisation, including: Database systems including relational, data warehousing & online analytical processing, "NoSQL" and real-time approaches; the pros and cons of each approach.
10	How to design, implement and optimise analytical algorithms – as prototypes and at production scale – using: An awareness of the computing and organisational resource constraints and trade-offs involved in selecting models, algorithms and tools.
SYLLABUS PLAN – summary of the structure and academic content of the module	
• Introduction to Databases and ethical considerations • Challenges of Big Data and legal considerations • Data use in industry and Information Governance • Entity Relationships • Normalisation • Reasons to de-normalise • Introduction to SQL (Retrieve, Update, Insert, Delete) • SQL - Wildcards and Regex • SQL (Grouping - Count, Sum, Group By) • SQL (Set Operations) • SQL (Joins - Inner and Outer) • Case Studies	

LEARNING AND TEACHING					
LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)					
Scheduled Learning and Teaching activities	45	Guided independent study	255	Placement/study abroad	0

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS		
Category	Hours of study time	Description
Scheduled Learning and Teaching	45	Interactive Lectures
Guided Independent Study	255	Work-based learning

ASSESSMENT					
FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade					
Form of Assessment		Size of the assessment e.g. duration/length		ILOs assessed	Feedback method
Homework activities after each session		1 hour each week		All	Oral/Automated/Peer
SUMMATIVE ASSESSMENT (% of credit)					
Coursework	40	Written exams	60	Practical exams	0

DETAILS OF SUMMATIVE ASSESSMENT				
Form of Assessment	% of credit	Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
Written assignment: Database Design	20	Approximately 4 pages long / 1500 words	1-2,4,6-9	Written and Verbal
Written assignment: SQL	20	Approximately 4 pages long / 1500 words	3,10	Written and Verbal
Examination	60	90 minutes	All	Exam results sheet

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)			
Original form of assessment	Form of reassessment	ILOs re-assessed	Time scale for re-assessment
Written assignment: Database Design	Written assignment: Database Design	1-2,4,6-9	August resubmission
Written assignment: SQL	Written assignment: SQL	3,10	August resubmission
Examination	Examination	All	August referral period

RE-ASSESSMENT NOTES

Where you have been referred/deferred for the exam, you will have the opportunity to take a second exam in the August/September re-assessment period.

Deferral – if you miss an assessment for certificated reasons judged acceptable by the Mitigation Committee, you will normally be either deferred in the assessment or an extension may be granted. The mark given for a re-assessment taken as a result of deferral will not be capped and will be treated as it would be if it were your first attempt at the assessment.

Referral – if you have failed the module overall (i.e. a final overall module mark of less than 40%) you will be required to resit the assessment as described in the tables above. The mark given for a re-assessment taken as a result of referral will be capped at 40%.

RESOURCES
INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type and level of information that you are expected to consult. Further guidance will be provided by the Module Convenor.
Indicative reading: EMC Education Services (2015). *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*. Wiley. Goodfellow, I et al. (2016). *Deep Learning*. Massachusetts Institute of Technology Cadle, J et al. (2014). *Business Analysis*. BCS, The Chartered Institute for IT; 3rd edition Han, J & Kamber, M (2011). *Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems)*. Morgan Kaufmann; 3 edition Provost, F. & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking.* O'Reilly Media; 1 edition Golfarelli, M & Rizzi, S (2009). *Data Warehouse Design: Modern Principles and Methodologies*. McGraw-Hill Education Kimball, R & Caserta, J (2004). *The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming, and Delivering Data*. John Wiley & Sons; 1 edition Kimball, R et al. (2008). *The Data Warehouse Lifecycle Toolkit*. John Wiley & Sons; 2nd Revised edition
Finlay, S. (2014). *Predictive Analytics, Data Mining and Big Data: Myths, Misconceptions and Methods (Business in the Digital Economy).* Palgrave Macmillan; 2014 edition Cole Nussbaumer Knaflic (2015). *Storytelling with Data: A Data Visualization Guide for Business Professionals*. John Wiley & Sons; 1 edition Geron, A. (2019) *Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*. OReilly; 2nd New edition James, G et al. (2013). *An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics)*. Springer; 2013th edition Web-based and electronic resources: Resources will be made available on the Microsoft Team teaching group connected to OneNote with the ClassNotebook add-in. https://moodle.exe-coll.ac.uk/my/ MyMaths - Bringing maths alive - Home W3Schools Online Web Tutorials Learning and Development Services (microsoft.com) https://www.bigbookofr.com https://r4ds.had.co.nz/ https://bookdown.org/rdpeng/rprogdatascience/

CREDIT VALUE	30	**ECTS VALUE**	15
PRE-REQUISITE MODULES	None		
CO-REQUISITE MODULES	None		
RCF LEVEL	4	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	20/05/2021	**LAST REVISION DATE**	20/05/2021
KEY WORDS SEARCH	Databases, Ethics, Legal, GDPR, E-R Diagrams, Normalisation, Denormalisation, SQL, Sets, Joins.		

MODULE TITLE	Introduction to Programming and Machine Learning				**CREDIT VALUE**	30
MODULE CODE	EXE1003		**MODULE CONVENOR**	Claire Collis		
DURATION	**TERM**	**1**	**2**		**Number Students Taking Module (anticipated)**	**12**
	WEEKS		15			

DESCRIPTION – summary of the module content
This module will introduce you to the theory behind structuring code and problem solving with an overview of Machine Learning methods. Programming topics will include sequence, input/output, selection, repetition, subroutines, as well as data types (including arrays, records, and simple classes). Topics covered will also include an overview of different machine learning methods, testing, and training data sets, regression, classification, and clustering.
MODULE AIMS – intentions of the module
This module will give you an introduction to simple Machine Learning methods and give you the underpinning programming knowledge to be able to interpret existing code and begin to develop your own. This module is a pre-requisite for *EXE2002 Statistical Tools and Modelling,* and *EXE2003 Software Development.* As part of this module, you will develop a range of knowledge, skills and behaviours as outlined by the Data Scientist apprenticeship standard and chosen by employers.
INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed) On successful completion of this module **you should be able to**:
Module Specific Skills and Knowledge:

1	Recognise fundamental programming constructs and how they can be used.
2	Evaluate how to prepare data for analysis
3	Outline how K means works
4	Evaluate when and how to apply Linear Regression
5	Evaluate when and how to apply the Decision Trees method
Discipline Specific Skills and Knowledge:	
6	Identify how Programs in Python work
7	Compare the use of R and Python for Data Science

Personal and Key Transferable/ Employment Skills and Knowledge:	
8	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.
9	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.)
10	How data can be used systematically, through an awareness of key platforms for data and analysis in an organisation, including: Data processing and storage, including on-premises and cloud technologies.
11	How data can be used systematically, through an awareness of key platforms for data and analysis in an organisation, including: Data-driven decision making and the good use of evidence and analytics in making choices and decisions.
12	How to design, implement and optimise analytical algorithms using: Advanced and predictive analytics, machine learning and artificial intelligence techniques, simulations, optimisation, and automation.
13	How to design, implement and optimise analytical algorithms using: Development standards, including programming practice, testing, source control.
14	The data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets: Common patterns in real-world data.

SYLLABUS PLAN – summary of the structure and academic content of the module

- Introduction to Structured Programming in Python: sequence, input and output, and data types
- Selection and String Handling
- Definite Iteration and Arrays
- Indefinite Iteration
- User defined data types and subroutines
- Comparing R and Python for data analysis
- Introduction to Machine learning: Data selection and preparation
- Creating Testing and Training data sets
- Introduction to Clustering: K means
- Introduction to Linear regression
- Introduction to classification: Decision Trees

LEARNING AND TEACHING					
LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)					
Scheduled Learning and Teaching activities	45	Guided independent study	255	Placement/study abroad	0

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS		
Category	Hours of study time	Description
Scheduled Learning and Teaching	45	Interactive Lectures
Guided Independent Study	255	Work-based learning

ASSESSMENT					
FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade					
Form of Assessment		Size of the assessment e.g. duration/length		ILOs assessed	Feedback method
Homework activities after each session		1 hour each week		All	Oral/Automated/Peer
SUMMATIVE ASSESSMENT (% of credit)					
Coursework	100	Written exams	0	Practical exams	0

DETAILS OF SUMMATIVE ASSESSMENT					
Form of Assessment	% of credit	Size of the assessment e.g. duration/length		ILOs assessed	Feedback method
Written assignment: Introduction to Programming in Python	30	Approximately 8 pages long		1,6,13	Written and Verbal
Written assignment: Data analysis tools and preparation, regression and classification	70	Approximately 20 pages long		2-5,7-12,14	Written and Verbal

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)			
Original form of assessment	Form of reassessment	ILOs re-assessed	Time scale for reassessment
Written assignment: Introduction to Programming in Python	Written assignment: Introduction to Programming in Python	1,6,13	August resubmission
Written assignment: Data analysis tools and preparation, regression and classification	Written assignment: Data analysis tools and preparation, regression and classification	2-5,7-12,14	August resubmission

RE-ASSESSMENT NOTES

Where you have been referred/deferred for the exam, you will have the opportunity to take a second exam in the August/September re-assessment period.

Deferral – if you miss an assessment for certificated reasons judged acceptable by the Mitigation Committee, you will normally be either deferred in the assessment or an extension may be granted. The mark given for a re-assessment taken as a result of deferral will not be capped and will be treated as it would be if it were your first attempt at the assessment.

Referral – if you have failed the module overall (i.e. a final overall module mark of less than 40%) you will be required to resit the assessment as described in the tables above. The mark given for a re-assessment taken as a result of referral will be capped at 40%.

RESOURCES
INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type and level of information that you are expected to consult. Further guidance will be provided by the Module Convenor.
Indicative reading: EMC Education Services (2015). *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*. Wiley. Goodfellow, I et al. (2016). *Deep Learning*. Massachusetts Institute of Technology Cadle, J et al. (2014). *Business Analysis*. BCS, The Chartered Institute for IT; 3rd edition Han, J & Kamber, M (2011). *Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems)*. Morgan Kaufmann; 3 edition
Provost, F. & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking.* O'Reilly Media; 1 edition Golfarelli, M & Rizzi, S (2009). *Data Warehouse Design: Modern Principles and Methodologies*. McGraw-Hill Education Kimball, R & Caserta, J (2004). *The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming, and Delivering Data*. John Wiley & Sons; 1 edition Kimball, R et al. (2008). *The Data Warehouse Lifecycle Toolkit*. John Wiley & Sons; 2nd Revised edition Finlay, S. (2014). *Predictive Analytics, Data Mining and Big Data: Myths, Misconceptions and Methods (Business in the Digital Economy).* Palgrave Macmillan; 2014 edition Cole Nussbaumer Knaflic (2015). *Storytelling with Data: A Data Visualization Guide for Business Professionals*. John Wiley & Sons; 1 edition Geron, A. (2019) *Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*. OReilly; 2nd New edition James, G et al. (2013). *An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics)*. Springer; 2013th edition Web-based and electronic resources: Resources will be made available on the Microsoft Team teaching group connected to OneNote with the ClassNotebook add-in. https://moodle.exe-coll.ac.uk/my/ MyMaths - Bringing maths alive - Home W3Schools Online Web Tutorials Learning and Development Services (microsoft.com) https://www.bigbookofr.com https://r4ds.had.co.nz/ https://bookdown.org/rdpeng/rprogdatascience/

CREDIT VALUE	30	**ECTS VALUE**	15
PRE-REQUISITE MODULES	EXE1001		
CO-REQUISITE MODULES	None		
RCF LEVEL	4	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	20/05/2021	**LAST REVISION DATE**	20/05/2021
KEY WORDS SEARCH	Sequence, Selection, Iteration, Data Types, String Handling, Arrays, Subroutines, Functions, Procedures, Test and Train sets, K means, Linear Regression, Decision Trees		

MODULE TITLE	Reflective Practice, Core Mathematics, and Work Based Projects				**CREDIT VALUE**	30
MODULE CODE	EXE1004		**MODULE CONVENOR**	Claire Collis		
DURATION	**TERM**	**1**	**2**		**Number Students Taking Module (anticipated)**	**12**
	WEEKS		15			

DESCRIPTION – summary of the module content

This module will give you the opportunity to begin to focus on portfolio competencies from an early stage and ensure that you have been introduced to core mathematical ideas required in later parts of the course. Portfolio workshops focussing on the apprenticeship standards outlined by the Institute of Apprenticeships will help you connect knowledge gained from other modules to the tasks you are completing in your place of work. Mathematical topics will include algebraic methods, common types of single variable functions in data science and introductory calculus.

MODULE AIMS – intentions of the module

This module will give you opportunities to develop practical experience of the previous modules covered and the chance to develop your team and working relationship skills whilst learning from working with others in similar roles. As part of this module, you will also cover core mathematical techniques. This will allow you to develop your ability to speak the language of mathematics and hence improve your ability to interpret resources for independent study as you further your professional development. As part of this module, you will develop a range of knowledge, skills and behaviours as outlined by the Data Scientist apprenticeship standard and chosen by employers.

INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed) On successful completion of this module **you should be able to**:

Module Specific Skills and Knowledge:	
1	Solve problems using core Mathematical topics
2	Examine how to integrate prior knowledge to apply it in project work
Discipline Specific Skills and Knowledge:	
3	Illustrate how to work as part of a team
4	Develop practical experience of Data Science project work

Personal and Key Transferable/ Employment Skills and Knowledge:	
5	Able to 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.
6	Able to 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.
7	Able to 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.
8	Able to 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.
9	Able to Implement data solutions, using relevant software engineering architectures and design patterns. Evaluate Cloud vs. on-premises 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.
10	Able to 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.
11	Able to 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.
12	Able to 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.
13	Demonstrate 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.
14	Demonstrate Empathy and positive engagement to enable working and collaborating in multidisciplinary teams, championing and highlighting ethics and diversity in data work.

15	Demonstrate Adaptability and dynamism when responding to varied tasks and organisational timescales, and pragmatism in the face of real-world scenarios.
16	Demonstrate Consideration of problems in the context of organisation goals.
17	Demonstrate 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.
18	Demonstrate A commitment to keeping up to date with current thinking and maintaining personal development.

SYLLABUS PLAN – summary of the structure and academic content of the module

- Introduction to group project requirements
- Project development focus - probability, statistics and data science
- Project development focus - databases, data sources, and ethics
- Algebra
- Coordinate Geometry
- Functions
- Calculus
- Individual synoptic project

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning and Teaching activities	45	Guided independent study	255	Placement/study abroad	0

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS

Category	Hours of study time	Description
Scheduled Learning and Teaching	45	Interactive Lectures
Guided Independent Study	255	Work-based learning

ASSESSMENT

FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade

Form of Assessment	Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
Homework activities after each session	1 hour each week	All	Oral/Automated/Peer

SUMMATIVE ASSESSMENT (% of credit)					
Coursework	60	Written exams	0	Practical exams	40

DETAILS OF SUMMATIVE ASSESSMENT				
Form of Assessment	% of credit	Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
Presentation: Group Project	30	15 minutes plus time for questioning / equivalent to approximately 2250 words	2-18	Written feedback with peer input
Written assignment: Core Mathematics	30	Approximately 6 pages long	1	Written
Individual Synoptic Project	40	15 Hours, open book assessment, with restricted access outside of the assessment sessions.	2-18	Written

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)			
Original form of assessment	Form of re-assessment	ILOs re-assessed	Time scale for re-assessment
Presentation: Group Project	2500-word individual report and employer reference	2-18	August resubmission
Written assignment: Core Mathematics	Written assignment: Core Mathematics	1	August resubmission
Individual Synoptic Project	Individual Synoptic Project	2-18	August referral period

RE-ASSESSMENT NOTES Where you have been referred/deferred for the exam, you will have the opportunity to take a second exam in the August/September re-assessment period.
Deferral – if you miss an assessment for certificated reasons judged acceptable by the Mitigation Committee, you will normally be either deferred in the assessment or an extension may be granted. The mark given for a re-assessment taken as a result of deferral will not be capped and will be treated as it would be if it were your first attempt at the assessment. Referral – if you have failed the module overall (i.e. a final overall module mark of less than 40%) you will be required to resit the assessment as described in the tables above. The mark given for a re-assessment taken as a result of referral will be capped at 40%.

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type and level of information that you are expected to consult. Further guidance will be provided by the Module Convenor.

Indicative reading:

EMC Education Services (2015). *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*. Wiley.

Goodfellow, I et al. (2016). *Deep Learning*. Massachusetts Institute of Technology Cadle, J et al. (2014). *Business Analysis*. BCS, The Chartered Institute for IT; 3rd edition

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Kimball, R et al. (2008). *The Data Warehouse Lifecycle Toolkit*. John Wiley & Sons; 2nd Revised edition

Finlay, S. (2014). *Predictive Analytics, Data Mining and Big Data: Myths, Misconceptions and Methods (Business in the Digital Economy).* Palgrave Macmillan; 2014 edition

Cole Nussbaumer Knaflic (2015). *Storytelling with Data: A Data Visualization Guide for Business Professionals*. John Wiley & Sons; 1 edition

Geron, A. (2019) *Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*. OReilly; 2nd New edition

James, G et al. (2013). *An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics)*. Springer; 2013th edition

Web-based and electronic resources:

Resources will be made available on the Microsoft Team teaching group connected to OneNote with the ClassNotebook add-in.

https://moodle.exe-coll.ac.uk/my/

MyMaths - Bringing maths alive - Home W3Schools Online Web Tutorials

Learning and Development Services (microsoft.com) https://www.bigbookofr.com

https://r4ds.had.co.nz/

https://bookdown.org/rdpeng/rprogdatascience/

CREDIT VALUE	30	**ECTS VALUE**	15
PRE-REQUISITE MODULES	EXE1001, EXE1002		
CO-REQUISITE MODULES	None		
RCF LEVEL	4	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	20/05/2021	**LAST REVISION DATE**	20/05/2021
KEY WORDS SEARCH	Algebra, Coordinate Geometry, Functions, Calculus, Group Project, Synoptic Project		

MODULE TITLE	Big Data and Data Science Ethics				**CREDIT VALUE**	15
MODULE CODE	EXE2001		**MODULE CONVENOR**		Claire Collis	
DURATION	**TERM**	**1**	**2**		**Number Students Taking Module (anticipated)**	**12**
	WEEKS	8				

DESCRIPTION – summary of the module content	
This module will re-introduce you to the concept of Big Data and begin to consider tools that are used in handling Big Data. You will also increase your focus on ethical issues in data science.	
MODULE AIMS – intentions of the module	
This module will focus on the importance of Ethical issues in Data Science and will consider a number of topic areas – some that have shaped legislation and other emerging areas. As part of this module, you will develop a range of knowledge, skills and behaviours as outlined by the Data Scientist apprenticeship standard and chosen by employers.	
INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed) On successful completion of this module **you should be able to**:	
Module Specific Skills and Knowledge:	
1	Evaluate tools used for Big Data
2	Discuss ethical issues in Data Science
Discipline Specific Skills and Knowledge:	
	N/A
Personal and Key Transferable/ Employment Skills and Knowledge:	
3	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.)
4	How data can be used systematically, through an awareness of key platforms for data and analysis in an organisation, including: Data-driven decision making and the good use of evidence and analytics in making choices and decisions.

SYLLABUS PLAN – summary of the structure and academic content of the module
• Schools of ethics in a data science context • Protected Characteristics • Data Science for Society • Avoiding harm • Data Science professional standards and trustworthiness • Accountability and Oversight • Introduction to Tools used for Big Data

LEARNING AND TEACHING					
LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)					
Scheduled Learning and Teaching activities	24	Guided independent study	126	Placement/study abroad	0

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS		
Category	Hours of study time	Description
Scheduled Learning and Teaching	24	Interactive Lectures
Guided Independent Study	126	Work-based learning

ASSESSMENT			
FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade			
Form of Assessment	Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
Homework activities after each session	1 hour each week	All	Oral/Automated/Peer

SUMMATIVE ASSESSMENT (% of credit)					
Coursework	40	Written exams	60	Practical exams	0

DETAILS OF SUMMATIVE ASSESSMENT				
Form of Assessment	% of credit	Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
Essay: Big Data and Ethics	40	1500 words	2-4	Written and Verbal
Exam	60	90 minutes	All	Exam results sheet

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)			
Original form of assessment	Form of re-assessment	ILOs re-assessed	Time scale for re-assessment
Essay: Big Data and Ethics	Essay: Big Data and Ethics	2-4	August resubmission
Exam	Exam	All	August resubmission

RE-ASSESSMENT NOTES

Where you have been referred/deferred for the exam, you will have the opportunity to take a second exam in the August/September re-assessment period.

Deferral – if you miss an assessment for certificated reasons judged acceptable by the Mitigation Committee, you will normally be either deferred in the assessment or an extension may be granted. The mark given for a re-assessment taken as a result of deferral will not be capped and will be treated as it would be if it were your first attempt at the assessment.

Referral – if you have failed the module overall (i.e. a final overall module mark of less than 40%) you will be required to resit the assessment as described in the tables above. The mark given for a re-assessment taken as a result of referral will be capped at 40%.

RESOURCES
INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type and level of information that you are expected to consult. Further guidance will be provided by the Module Convenor.
Indicative reading: EMC Education Services (2015). *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*. Wiley. Goodfellow, I et al. (2016). *Deep Learning*. Massachusetts Institute of Technology Cadle, J et al. (2014). *Business Analysis*. BCS, The Chartered Institute for IT; 3rd edition Han, J & Kamber, M (2011). *Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems)*. Morgan Kaufmann; 3 edition Provost, F. & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking.* O'Reilly Media; 1 edition

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Kimball, R & Caserta, J (2004). *The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming, and Delivering Data*. John Wiley & Sons; 1 edition
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Geron, A. (2019) *Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*. OReilly; 2nd New edition
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Web-based and electronic resources:

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https://moodle.exe-coll.ac.uk/my/
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https://r4ds.had.co.nz/
https://bookdown.org/rdpeng/rprogdatascience/
https://www.actuaries.org.uk/system/files/field/document/An%20Ethical%20Charter%20for%20Date%20Science%20WEB%20FINAL.PDF
Fundamental introduction to ethical thinking
Protected characteristics and why they matter
(GDPR)

CREDIT VALUE	15	**ECTS VALUE**	7.5
PRE-REQUISITE MODULES	None		
CO-REQUISITE MODULES	None		
RCF LEVEL	5	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	20/05/2021	**LAST REVISION DATE**	20/05/2021
KEY WORDS SEARCH	Ethics, Big Data		

MODULE TITLE	Statistical Tools and Modelling				**CREDIT VALUE**	30
MODULE CODE	EXE2002		**MODULE CONVENOR**		Larisa Seward	
DURATION	**TERM**	**1**	**2**		**Number Students Taking Module (anticipated)**	**12**
	WEEKS	15				

DESCRIPTION – summary of the module content
This module will cover a selection of statistical tools and modelling techniques as well as linear algebra needed to give a strong foundation for progression to higher levels. Topics will include clustering techniques, regression models, time series analysis, classification methods, and text analysis. This module will run alongside the reflective practice module, giving you the opportunity to put this knowledge into practice in your workplace.
MODULE AIMS – intentions of the module
This module will give you a grounding in Linear Algebra needed for later parts of the course and options to progress on to higher levels of study in future. This module also gives an introduction to Machine Learning Methods with a selection of examples that can later be applied in work-based projects. This module is a pre-requisite for *EXE3002 Advanced Stats Modelling, Machine Learning, AI and Data Science Ethics*. As part of this module, you will develop a range of knowledge, skills and behaviours as outlined by the Data Scientist apprenticeship standard and chosen by employers.
INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed) On successful completion of this module **you should be able to**:

Module Specific Skills and Knowledge:	
1	Evaluate possible Distributions and Uncertainty
2	Analyse Numerical Computations
Discipline Specific Skills and Knowledge:	
4	Appraise different Clustering techniques
5	Apply Regression techniques
6	Evaluate Text Analysis techniques
7	Design Time Series Forecasting models

Personal and Key Transferable/ Employment Skills and Knowledge:	
8	How to design, implement and optimise analytical algorithms – as prototypes and at production scale – using: Statistical and mathematical models and methods.
9	How to design, implement and optimise analytical algorithms – as prototypes and at production scale – using: Advanced and predictive analytics, machine learning and artificial intelligence techniques, simulations, optimisation, and automation.
10	The data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets: Sources of data including but not exclusive to files, operational systems, databases, web services, open data, government data, news and social media.
11	The data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets: Data formats, structures and data delivery methods including "unstructured" data.
12	Describe the data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets, and common patterns in real-world data.

SYLLABUS PLAN – summary of the structure and academic content of the module

- Probability Distributions
- Sampling Distributions
- Quantifying Uncertainty
- Machine Learning Overview
- Numerical Computation and Clustering
- Linear Regression
- Logistic Regression
- GLMs
- Text Analysis
- Time Series Forecasting

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning and Teaching activities	45	Guided independent study	255	Placement/study abroad	0

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS

Category	Hours of study time	Description
Scheduled Learning and Teaching	45	Interactive Lectures
Guided Independent Study	225	Work-based learning

ASSESSMENT						
FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade						
Form of Assessment		Size of the assessment e.g. duration/length		ILOs assessed	Feedback method	
Homework activities after each session		1 hour each week		All	Oral/Automated/Peer	
SUMMATIVE ASSESSMENT (% of credit)						
Coursework	45	Written exams	55	Practical exams	0	
DETAILS OF SUMMATIVE ASSESSMENT						
Form of Assessment	% of credit	Size of the assessment e.g. duration/length		ILOs assessed	Feedback method	
Written assignment: Distributions and Uncertainty	15	Approximately 4 pages long		1	Written and Verbal	
Written assignment: Machine Learning Foundations	15	Approximately 4 pages 2-10,12		Written and Verbal	Written and Verbal	
Written assignment: Text Analysis and Time Series Forecasting	15	Approximately 4 pages 2-12		Written and Verbal	Written and verbal	
Examination	55	90 minutes		All	Exam results sheet	
DETAILS OF RE-ASSESSMENT (where required by referral or deferral)						
Original form of assessment		Form of re-assessment		ILOs re-assessed	Time scale for re-assessment	
Written assignment: Distributions and Uncertainty		Written assignment: Distributions and Uncertainty		1	August resubmission	
Written assignment: Machine Learning Foundations		Written assignment: Machine Learning Foundations		2-10,12	August resubmission	
Written assignment: Text Analysis and Time Series Forecasting		Written assignment: Text Analysis and Time Series Forecasting		2-12	August resubmission	
Examination		Examination		All	August referral period	

RE-ASSESSMENT NOTES

Where you have been referred/deferred for the exam, you will have the opportunity to take a second exam in the August/September re-assessment period.

Deferral – if you miss an assessment for certificated reasons judged acceptable by the Mitigation Committee, you will normally be either deferred in the assessment or an extension may be granted. The mark given for a re-assessment taken as a result of deferral will not be capped and will be treated as it would be if it were your first attempt at the assessment.

Referral – if you have failed the module overall (i.e. a final overall module mark of less than 40%) you will be required to resit the assessment as described in the tables above. The mark given for a re-assessment taken as a result of referral will be capped at 40%.

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type and level
of information that you are expected to consult. Further guidance will be provided by the Module Convenor.

Indicative reading:

EMC Education Services (2015). *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*. Wiley.

Goodfellow, I et al. (2016). *Deep Learning*. Massachusetts Institute of Technology Cadle, J et al. (2014). *Business Analysis*. BCS, The Chartered Institute for IT; 3rd edition

Han, J & Kamber, M (2011). *Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems)*. Morgan Kaufmann; 3 edition

Provost, F. & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking.* O'Reilly Media; 1 edition

Golfarelli, M & Rizzi, S (2009). *Data Warehouse Design: Modern Principles and Methodologies*. McGraw-Hill Education

Kimball, R & Caserta, J (2004). *The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming, and Delivering Data*. John Wiley & Sons; 1 edition

Kimball, R et al. (2008). *The Data Warehouse Lifecycle Toolkit*. John Wiley & Sons; 2nd Revised edition
Finlay, S. (2014). *Predictive Analytics, Data Mining and Big Data: Myths, Misconceptions and Methods (Business in the Digital Economy).* Palgrave Macmillan; 2014 edition
Cole Nussbaumer Knaflic (2015). *Storytelling with Data: A Data Visualization Guide for Business Professionals*. John Wiley & Sons; 1 edition
Geron, A. (2019) *Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*. OReilly; 2nd New edition
James, G et al. (2013). *An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics)*. Springer; 2013th edition

Web-based and electronic resources:

Resources will be made available on the Microsoft Team teaching group connected to OneNote with the ClassNotebook add-in.
https://moodle.exe-coll.ac.uk/my/
MyMaths - Bringing maths alive -
Home W3Schools Online Web
Tutorials
Learning and Development Services
(microsoft.com) https://www.bigbookofr.com
https://r4ds.had.co.nz/
https://bookdown.org/rdpeng/rprogdatascienc
e/

CREDIT VALUE	30	**ECTS VALUE**	15
PRE-REQUISITE MODULES	EXE1001		
CO-REQUISITE MODULES	None		
RCF LEVEL	5	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	14/05/2021	**LAST REVISION DATE**	18/05/2021
KEY WORDS SEARCH	Probability, Distributions, Sampling, Uncertainty, Machine Learning, Clustering, Regression, Text Analysis, Unstructured Data, Time Series Forecasting		

MODULE TITLE	Software Development				**CREDIT VALUE**	30
MODULE CODE	EXE2003		**MODULE CONVENOR**		Alex Upcroft	
DURATION	**TERM**	**1**	**2**		**Number Students Taking Module (anticipated)**	**12**
	WEEKS		15			

DESCRIPTION – summary of the module content

This module addresses the growing demand for analysis of data to be presented through bespoke applications and dashboarding. The development lifecycle will be discussed as an overview, and you will be able to investigate the details of the lifecycle followed by your employer. Topics included will include:

- Project Management
- UML modelling
- Prototyping
- Design
- Architecture
- Testing (UAT and System)
- Release management and version control
- Evaluation

MODULE AIMS – intentions of the module

This module will give you an understanding of Software Development in the context of Data Science. You will also consider more advanced data storage structures and software tools used to access these as well as the tools needed to integrate data for dashboarding. This module is a pre-requisite for *EXE3001 Advanced Data Applications and Data Visualisation*. As part of this module, you will develop a range of knowledge, skills and behaviours as outlined by the Data Scientist apprenticeship standard and
chosen by employers.

INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed) On successful completion of this module **you should be able to**:

Module Specific Skills and Knowledge:

1	Analyse problems and Design suitable Data Science solutions.
2	Consider how Database architectures may affect construction of a solution.
3	Apply advanced SQL techniques
4	Devise Testing and Evaluation plans

Discipline Specific Skills and Knowledge:	
5	Apply Data Integration Tools
6	Manipulate Dashboarding Tools
Personal and Key Transferable/ Employment Skills and Knowledge:	
7	How to design, implement and optimise analytical algorithms – as prototypes and at production scale – using: An awareness of the computing and organisational resource constraints and trade-offs involved in selecting models, algorithms and tools.
8	How to design, implement and optimise analytical algorithms – as prototypes and at production scale – using: Development standards, including programming practice, testing, source control.

SYLLABUS PLAN – summary of the structure and academic content of the module

- Software Development Lifecycle
- Project Management and version control
- Analysis
- Design
- Database architectures
- Data Integration Tools
- Data Scraping
- SQL Subroutines
- Application Programming Interfaces
- Tools for Dashboarding
- Testing and Evaluation

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning and Teaching activities	45	Guided independent study	255	Placement/study abroad	0

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS

Category	Hours of study time	Description
Scheduled Learning and Teaching	45	Interactive Lectures
Guided Independent Study	225	Work-based learning

ASSESSMENT					
FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade					
Form of Assessment		Size of the assessment e.g. duration/length		ILOs assessed	Feedback method
Homework activities after each session		1 hour each week		All	Oral/Automated/Peer
SUMMATIVE ASSESSMENT (% of credit)					
Coursework	100	Written exams	0	Practical exams	0
DETAILS OF SUMMATIVE ASSESSMENT					
Form of Assessment	% of credit	Size of the assessment e.g. duration/length		ILOs assessed	Feedback method
Written assignment: Software Development Lifecycle and storage tools	33.3	Approximately 8 pages long / 2500 words		1-2, 5	Written and Verbal
Written assignment: Programming Techniques and Tools	33.3	Approximately 8 pages / 2500 words		3, 8	Written and Verbal
Writtenassignment: Implementation, Testing and Evaluation	33.3	Approximately 8 pages long / 2500 words		4,6,9	Written and Verbal
DETAILS OF RE-ASSESSMENT (where required by referral or deferral)					
Original form of assessment		Form of reassessment		ILOs re-assessed	Time scale for reassessment
Written assignment: Software Development Lifecycle and storage tools		Written assignment: Software Development Lifecycle and storage tools		1-2,5	August resubmission
Written assignment: Programming Techniques and Tools		Written assignment: Programming Techniques and Tools		3,8	August resubmission
Written assignment: Implementation, Testing and Evaluation		Written assignment: Implementation, Testing and Evaluation		4,6,9	August resubmission

RE-ASSESSMENT NOTES

Where you have been referred/deferred for the exam, you will have the opportunity to take a second exam in the August/September re-assessment period.

Deferral – if you miss an assessment for certificated reasons judged acceptable by the Mitigation Committee, you will normally be either deferred in the assessment or an extension may be granted. The mark given for a re-assessment taken as a result of deferral will not be capped and will be treated as it would be if it were your first attempt at the assessment.

Referral – if you have failed the module overall (i.e. a final overall module mark of less than 40%) you will be required to resit the assessment as described in the tables above. The mark given for a re-assessment taken as a result of referral will be capped at 40%.

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type and level
of information that you are expected to consult. Further guidance will be provided by the Module Convenor.

Indicative reading:

EMC Education Services (2015). *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*. Wiley.
Goodfellow, I et al. (2016). *Deep Learning*. Massachusetts Institute of
Technology Cadle, J et al. (2014). *Business Analysis*. BCS, The Chartered Institute
for IT; 3rd edition
Han, J & Kamber, M (2011). *Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems)*. Morgan Kaufmann; 3 edition
Provost, F. & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking.* O'Reilly Media; 1 edition

Golfarelli, M & Rizzi, S (2009). *Data Warehouse Design: Modern Principles and Methodologies*. McGraw-Hill Education
Kimball, R & Caserta, J (2004). *The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming, and Delivering Data*. John Wiley & Sons; 1 edition
Kimball, R et al. (2008). *The Data Warehouse Lifecycle Toolkit*. John Wiley & Sons; 2nd Revised edition
Finlay, S. (2014). *Predictive Analytics, Data Mining and Big Data: Myths, Misconceptions and Methods (Business in the Digital Economy).* Palgrave Macmillan; 2014 edition
Cole Nussbaumer Knaflic (2015). *Storytelling with Data: A Data Visualization Guide for Business Professionals*. John Wiley & Sons; 1 edition
Geron, A. (2019) *Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*. OReilly; 2nd New edition
James, G et al. (2013). *An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics)*. Springer; 2013th edition

Web-based and electronic resources:

Resources will be made available on the Microsoft Team teaching group connected to OneNote with the ClassNotebook add-in.
https://moodle.exe-coll.ac.uk/my/
MyMaths - Bringing maths alive - Home
W3Schools Online Web Tutorials
Learning and Development Services (microsoft.com) https://www.bigbookofr.com
https://r4ds.had.co.nz/
https://bookdown.org/rdpeng/rprogdatascience/

CREDIT VALUE	30	**ECTS VALUE**	15
PRE-REQUISITE MODULES	EXE1002, EXE1003		
CO-REQUISITE MODULES	None		
RCF LEVEL	5	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	14/05/2021	**LAST REVISION DATE**	18/05/2021
KEY WORDS SEARCH	Software Development Lifecycle, project management, database architecture, data integration tools, SQL, R, APIs, Dashboarding tools		

MODULE TITLE	Reflective Practice and Group Projects				**CREDIT VALUE**	45
MODULE CODE	EXE2004		**MODULE CONVENOR**		Claire Collis	
DURATION	**TERM**	**1**	**2**		**Number Students Taking Module (anticipated)**	**12**
	WEEKS	7	15			

DESCRIPTION – summary of the module content
This module will build on the progress you made in *EXE1004 Reflective Practice, Core Mathematics, and Work Based Projects*. You will have the opportunity to complete a group project which will facilitate peer learning and lead to a greater sharing of skills between you and your peers from differing work sectors. Sessions will consist of portfolio competency workshops (as detailed on the apprenticeship standard), applying a selection of techniques introduced in other modules, guided group project sessions, and group presentations.
MODULE AIMS – intentions of the module
This module will give you opportunities to develop practical experience of the previous modules covered and the chance to develop your team and working relationship skills whilst learning from working with others in similar roles. As part of this module, you will develop a range of knowledge, skills and behaviours as outlined by the Data Scientist apprenticeship standard and chosen by employers.
INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed) On successful completion of this module **you should be able to**:
Module Specific Skills and Knowledge:
1 Integrate prior knowledge to apply it in project work
Discipline Specific Skills and Knowledge:
2 Judge the best way of working as part of a team
3 Develop practical experience of Data Science project work

Personal and Key Transferable/ Employment Skills and Knowledge:	
4	Able to 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.
5	Able to 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.
6	Able to 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.
7	Able to 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.
8	Able to 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.
9	Able to 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.
10	Able to 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.
11	Able to 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.
12	Demonstrate 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.

13	Demonstrate Empathy and positive engagement to enable working and collaborating in multidisciplinary teams, championing and highlighting ethics and diversity in data work.
14	Demonstrate Adaptability and dynamism when responding to varied tasks and organisational timescales, and pragmatism in the face of real-world scenarios.
15	Demonstrate Consideration of problems in the context of organisation goals.
16	Demonstrate 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.
17	Demonstrate A commitment to keeping up to date with current thinking and maintaining personal development.

SYLLABUS PLAN – summary of the structure and academic content of the module

- Group Project
- Individual Work-based Projects
- Tutorials to discuss how to apply prior learning from EXE1001, EXE1002, EXE1003, and EXE2001 in individual workplaces.

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning and Teaching activities	66	Guided independent study	384	Placement/study abroad	0

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS

Category	Hours of study	Description time
Scheduled Learning and Teaching	66	Interactive Lectures
Guided Independent Study	384	Work-based learning

ASSESSMENT

FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade

Form of Assessment	Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
Homework activities after each session	1 hour each week	All	Oral/Automated/Peer

SUMMATIVE ASSESSMENT (% of credit)

Coursework	100	Written exams	0	Practical exams	0

DETAILS OF SUMMATIVE ASSESSMENT				
Form of Assessment	% of credit	Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
Presentation: Group Project	33	15 minutes plus time for questioning	All	Written feedback with peer input
Written Report	67	7500 Words. Consisting of up to 3 separate project reports.	All	Written

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)			
Original form of assessment	Form of re-assessment	ILOs re-assessed	Time scale for re-assessment
Presentation: Group Project	2500-word individual report and employer reference	All	August resubmission
Written Report	Written Report	All	August resubmission

RE-ASSESSMENT NOTES

Where you have been referred/deferred for the exam, you will have the opportunity to take a second exam in the August/September re-assessment period.

Deferral – if you miss an assessment for certificated reasons judged acceptable by the Mitigation Committee, you will normally be either deferred in the assessment or an extension may be granted. The mark given for a re-assessment taken as a result of deferral will not be capped and will be treated as it would be if it were your first attempt at the assessment.

Referral – if you have failed the module overall (i.e. a final overall module mark of less than 40%) you will be required to resit the assessment as described in the tables above. The mark given for a re-assessment taken as a result of referral will be capped at 40%.

RESOURCES
INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type and level of information that you are expected to consult. Further guidance will be provided by the Module Convenor.
Indicative reading: EMC Education Services (2015). *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*. Wiley. Goodfellow, I et al. (2016). *Deep Learning*. Massachusetts Institute of Technology Cadle, J et al. (2014). *Business Analysis*. BCS, The Chartered Institute for IT; 3rd edition
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CREDIT VALUE	45	**ECTS VALUE**	22.5
PRE-REQUISITE MODULES	EXE1001, EXE1002, EXE1003, EXE2001		
CO-REQUISITE MODULES	None		
RCF LEVEL	5	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	20/05/2021	**LAST REVISION DATE**	20/05/2021
KEY WORDS SEARCH	Group Project, Synoptic Project		

MODULE TITLE	Advanced Data Applications and Data Visualisation				**CREDIT VALUE**	30
MODULE CODE	EXE3001		**MODULE CONVENOR**	Larisa Seward		
DURATION	**TERM**	**1**	**2**		**Number Students Taking Module (anticipated)**	**12**
	WEEKS	15				

DESCRIPTION – summary of the module content
This module builds upon topics from Introduction to Probability, Statistics and Data Science to introduce a variety of practical, open-ended problems, typical of those that data scientists encounter in industry and commerce. We will cover current advances in data science as well as the evolving differences between Data Science and Statistics. Specific projects are tackled through workshops and apprentice led group activities. The real-life nature of the problems requires you to develop skills in model development and refinement, designing data visualisations, presenting to stakeholders and teamwork. You will have an opportunity to apply a variety of statistical methods and knowledge learned in previous years.
MODULE AIMS – intentions of the module
This module will enable you to explore how Data Science can be applied in a business context. You will explore how to use a variety of data sets to integrate, model and appropriately visualise data in order to give greater insights for business management. You will develop your understanding of interactive visualisations and the impact that Data Science can have. You will develop a range of knowledge, skills and behaviours as outlined by the Data Scientist apprenticeship standard and chosen by employers.
INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed) On successful completion of this module **you should be able to**:
Module Specific Skills and Knowledge:
1 Create appropriate static dashboards with a variety of considerations.
2 Create appropriate dynamic dashboards with a variety of considerations.
Discipline Specific Skills and Knowledge:
N/A

Personal and Key Transferable/ Employment Skills and Knowledge:	
3	The data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets: Sources of data including but not exclusive to files, operational systems, databases, web services, open data, government data, news and social media.
4	The data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets: Data formats, structures and data delivery methods including "unstructured" data.
5	The data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets: Common patterns in real-world data.

SYLLABUS PLAN – summary of the structure and academic content of the module

- Data for Business Management
- Principles of Design and Branding
- Model outputs and appropriate visualisations
- Grammar of graphics
- Introduction to Geospatial data
- Static Visualisation
- APIs and live dataset queries
- Interactive Visualisation
- Actions from data insights
- Assessing project impact

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning and Teaching activities	45	Guided independent study	255	Placement/study abroad	0

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS

Category	Hours of study	Description time
Scheduled Learning and Teaching	45	Interactive Lectures
Guided Independent Study	255	Work-based learning

ASSESSMENT						
FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade						
Form of Assessment		Size of the assessment e.g. duration/length		ILOs assessed	Feedback method	
Homework activities after each session		1 hour each week		All	Oral/Automated/Peer	
SUMMATIVE ASSESSMENT (% of credit)						
Coursework	100	Written exams	0	Practical exams	0	
DETAILS OF SUMMATIVE ASSESSMENT						
Form of Assessment	% of credit	Size of the assessment e.g. duration/length		ILOs assessed	Feedback method	
Static dashboard with version history and annotated reasoning	50	Source code and Dashboard plus up to 3750 words of annotation.		1, 3-5	Written and verbal	
Interactive dashboard with version history and annotated reasoning	50	Source code and Dashboard plus up to 3750 words of annotation.		2-5	Written and verbal	
DETAILS OF RE-ASSESSMENT (where required by referral or deferral)						
Original form of assessment	Form of re-assessment		ILOs re-assessed	Time scale for re-assessment		
Static dashboard with version history and annotated reasoning	Static dashboard with version history and annotated reasoning		1, 3-5	August resubmission		
Interactive dashboard with version history and annotated reasoning	Interactive dashboard with version history and annotated reasoning		2-5	August resubmission		

RE-ASSESSMENT NOTES

Where you have been referred/deferred for the exam, you will have the opportunity to take a second exam in the August/September re-assessment period.

Deferral – if you miss an assessment for certificated reasons judged acceptable by the Mitigation Committee, you will normally be either deferred in the assessment or an extension may be granted. The mark given for a re-assessment taken as a result of deferral will not be capped and will be treated as it would be if it were your first attempt at the assessment.

Referral – if you have failed the module overall (i.e. a final overall module mark of less than 40%) you will be required to resit the assessment as described in the tables above. The mark given for a re-assessment
taken as a result of referral will be capped at 40%.

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type and level of information that you are expected to consult. Further guidance will be provided by the Module Convenor.

Indicative reading:

EMC Education Services (2015). *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*. Wiley.

Goodfellow, I et al. (2016). *Deep Learning*. Massachusetts Institute of Technology Cadle, J et al. (2014). *Business Analysis*. BCS, The Chartered Institute for IT; 3rd edition

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Kimball, R & Caserta, J (2004). *The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming, and Delivering Data*. John Wiley & Sons; 1 edition

Kimball, R et al. (2008). *The Data Warehouse Lifecycle Toolkit*. John Wiley & Sons; 2nd Revised edition

Finlay, S. (2014). *Predictive Analytics, Data Mining and Big Data: Myths, Misconceptions and Methods (Business in the Digital Economy).* Palgrave Macmillan; 2014 edition

Cole Nussbaumer Knaflic (2015). *Storytelling with Data: A Data Visualization Guide for Business Professionals*. John Wiley & Sons; 1 edition Geron, A. (2019) *Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*. OReilly; 2nd New edition

James, G et al. (2013). *An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics)*. Springer; 2013th edition

Web-based and electronic resources:

Resources will be made available on the Microsoft Team teaching group connected to OneNote with the ClassNotebook add-in.

https://moodle.exe-coll.ac.uk/my/
MyMaths - Bringing maths alive - Home
W3Schools Online Web Tutorials
Learning and Development Services (microsoft.com) https://www.bigbookofr.com
https://r4ds.had.co.nz/
https://bookdown.org/rdpeng/rprogdatascience/

CREDIT VALUE	30	**ECTS VALUE**	15
PRE-REQUISITE MODULES	EXE2001, EXE2002, EXE2003		
CO-REQUISITE MODULES	None		
RCF LEVEL	6	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	14/05/2021	**LAST REVISION DATE**	Sept 2024
KEY WORDS SEARCH	Business Management, Principles of Design, Visualisations, Geospacial, Static and Dynamic Dashboards, Project Impact		

MODULE TITLE	Advanced Stats Modelling, Machine Learning, AI and Data Science Ethics				**CREDIT VALUE**	30
MODULE CODE	EXE3002		**MODULE CONVENOR**	Claire Collis		
DURATION	**TERM**	**1**	**2**		**Number Students Taking Module (anticipated)**	**12**
	WEEKS	15				

DESCRIPTION – summary of the module content
You will broaden your knowledge and experience of applied statistics. You will study a wide range of statistical models and methods relevant to the modelling of datasets gathered from diverse applications. You will be trained further in the use of high-level statistical packages. You will be introduced to the principles, techniques and applications of machine learning and pattern recognition. You will also develop the skills to apply data mining techniques on real data sets utilising cloud computing resources and recognised machine-learning models. The potential and limitations of big data will be discussed in greater detail. Building upon the Big Data and Data Science Ethics module, the principles of ethical data-driven development of decision-making tools will be introduced. It will enable you to understand real-world implications and consequences of developing AI techniques and appreciate the range of data science techniques that can be used to analyse and manage biased data.
MODULE AIMS – intentions of the module
This module will enable you to identify and deliver appropriate statistical methods, develop your understanding of machine learning and artificial intelligence, as well as considering ethics in a deeper way. You will develop a range of knowledge, skills and behaviours as outlined by the Data Scientist apprenticeship standard and chosen by employers.
INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed) On successful completion of this module **you should be able to**:
Module Specific Skills and Knowledge:

1	Evaluate how to prepare data sets for analysis.
2	Analyse and mine data sets for patterns and insights
3	Apply classifying methods
4	Apply Image processing and machine vision methods
5	Appraise the ethics of data-driven decision making

Discipline Specific Skills and Knowledge:	
	N/A
Personal and Key Transferable/ Employment Skills and Knowledge:	
6	Report on 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.
7	Report 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.)
8	Apply knowledge of how to design, implement and optimise analytical algorithms – as prototypes and at production scale – using: Statistical and mathematical models and methods.
9	Apply knowledge of how to design, implement and optimise analytical algorithms – as prototypes and at production scale – using: Advanced and predictive analytics, machine learning and artificial intelligence techniques, simulations, optimisation, and automation.
10	Apply knowledge of how to design, implement and optimise analytical algorithms – as prototypes and at production scale – using: Applications such as computer vision and Natural Language Processing
11	Apply knowledge of how to design, implement and optimise analytical algorithms – as prototypes and at production scale – using: Development standards, including programming practice, testing, source control.
12	Appraise the data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets: Sources of data including but not exclusive to files, operational systems, databases, web services, open data, government data, news and social media.
13	Appraise the data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets: Data formats, structures and data delivery methods including "unstructured" data.
14	Appraise the data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets: Common patterns in real-world data.

SYLLABUS PLAN – summary of the structure and academic content of the module
• Cloud computing for Data Science • Data Mining • Techniques for handling missing data • Anomoly detection • Association rules • Probability and Information theory • Classifiers • Image Processing and Machine Vision • Ethical data-driven decision making • Assessing project impact

LEARNING AND TEACHING					
LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)					
Scheduled Learning and Teaching activities	45	Guided independent study	255	Placement/study abroad	0

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS		
Category	Hours of study	Description time
Scheduled Learning and Teaching	45	Interactive Lectures
Guided Independent Study	255	Work-based learning

ASSESSMENT			
FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade			
Form of Assessment	Size of the assessment e.g. duration/length	LOs assessed	Feedback method
Homework activities after each session	1 hour each week	All	Oral/Automated/Peer

SUMMATIVE ASSESSMENT (% of credit)					
Coursework	45	Written exams	55	Practical exams	0

DETAILS OF SUMMATIVE ASSESSMENT				
Form of Assessment	% of credit	Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
Written assignment: Data Mining	15	Approximately 4 pages long / equivalent to approximately 1125 words	1, 2, 8, 11-14	Written and Verbal
Written assignment: Classifiers and Machine Vision	15	Approximately 4 pages long / equivalent to approximately 1125 words	3, 4, 8-10, 13, 14	Written and Verbal
Written assignment: Ethics	15	Approximately 4 pages long / equivalent to approximately 1125 words	5-7	Written and Verbal
Examination	55	90 minutes	All	Exam results sheet

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)			
Original form of assessment	Form of re-assessment	ILOs re-assessed	Time scale for re-assessment
Written assignment: Data Mining	Written assignment: Data Mining	1, 2, 8, 11-14	August resubmission
Written assignment: Classifiers and Machine Vision	Written assignment: Classifiers and Machine Vision	3, 4, 8-10, 13, 14	August resubmission
Written assignment: Ethics	Written assignment: Ethics	5-7	August resubmission
Examination	Examination	All	August referral period

RE-ASSESSMENT NOTES

Where you have been referred/deferred for the exam, you will have the opportunity to take a second exam in the August/September re-assessment period.

Deferral – if you miss an assessment for certificated reasons judged acceptable by the Mitigation Committee, you will normally be either deferred in the assessment or an extension may be granted. The mark given for a re-assessment taken as a result of deferral will not be capped and will be treated as it would be if it were your first attempt at the assessment.

Referral – if you have failed the module overall (i.e. a final overall module mark of less than 40%) you will be required to resit the assessment as described in the tables above. The mark given for a re-assessment taken as a result of referral will be capped at 40%.

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type and level of information that you are expected to consult. Further guidance will be provided by the Module Convenor.

Indicative reading:

EMC Education Services (2015). *Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*. Wiley.

Goodfellow, I et al. (2016). *Deep Learning*. Massachusetts Institute of Technology Cadle, J et al. (2014). *Business Analysis*. BCS, The Chartered Institute for IT; 3rd edition

Han, J & Kamber, M (2011). *Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems)*. Morgan Kaufmann; 3 edition

Provost, F. & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking.* O'Reilly Media; 1 edition

Golfarelli, M & Rizzi, S (2009). *Data Warehouse Design: Modern Principles and Methodologies*. McGraw-Hill Education

Kimball, R & Caserta, J (2004). *The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming, and Delivering Data*. John Wiley & Sons; 1 edition

Kimball, R et al. (2008). *The Data Warehouse Lifecycle Toolkit*. John Wiley & Sons; 2nd Revised edition

Finlay, S. (2014). *Predictive Analytics, Data Mining and Big Data: Myths, Misconceptions and Methods (Business in the Digital Economy).* Palgrave Macmillan; 2014 edition

Cole Nussbaumer Knaflic (2015). *Storytelling with Data: A Data Visualization Guide for Business Professionals*. John Wiley & Sons; 1 edition

Geron, A. (2019) *Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*. OReilly; 2nd New edition

James, G et al. (2013). *An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics)*. Springer; 2013th edition

Web-based and electronic resources: https://moodle.exe-coll.ac.uk/my/ MyMaths - Bringing maths alive - Home W3Schools Online Web Tutorials Learning and Development Services (microsoft.com) https://www.bigbookofr.com https://r4ds.had.co.nz/ https://bookdown.org/rdpeng/rprogdatascience/

CREDIT VALUE	30	**ECTS VALUE**	15
PRE-REQUISITE MODULES	EXE2002		
CO-REQUISITE MODULES	None		
RCF LEVEL	6	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	14/05/2021	**LAST REVISION DATE**	Sept 2024
KEY WORDS SEARCH	Cloud Computing, Data Mining, Data Quality, Text Analysis, Information theory, Classifiers, Image Processing, Machine Vision, Ethical Data-Driven Decision Making		

MODULE TITLE	Reflective Practice				**CREDIT VALUE**	60
MODULE CODE	EXE3003		**MODULE CONVENOR**		Claire Collis	
DURATION	**TERM**	**1**	**2**		**Number Students Taking Module (anticipated)**	**12**
	WEEKS		15			

DESCRIPTION – summary of the module content
This module will give you the opportunity to apply and demonstrate use of the techniques you have developed during your time on the course in a portfolio of evidence, alongside a work based project and report. This module will be assessed according the IfA Level 6 Data Science assessment plan available here: https://www.instituteforapprenticeships.org/media/1973/st0585_data-scientist-integrateddegree_l6_ap-for-publication_230718.pdf You must complete the assessments in this module within 6 months of entering gateway (typically after 36 months on the programme).
MODULE AIMS – intentions of the module
This module will give you opportunities to develop practical experience of the previous modules covered and the chance to develop your team and working relationship skills. As part of this module, you will develop a range of knowledge, skills and behaviours as outlined by the Data Scientist apprenticeship standard and chosen by employers.
INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed) On successful completion of this module **you should be able to**:
Module Specific Skills and Knowledge:
1 Integrate prior knowledge to apply it in project work
Discipline Specific Skills and Knowledge:
2 Defend the way you work as part of a team
3 Develop practical experience of Data Science project work
Personal and Key Transferable/ Employment Skills and Knowledge:
4 Report and demonstrate understanding of all Knowledge, Skills, and Behaviours competencies as outlined on the apprenticeship standard

SYLLABUS PLAN – summary of the structure and academic content of the module
• Professional Development Planning to ensure all of the apprenticeship standards are addressed • Formative feedback on the progress of your portfolio • Support in collating your portfolio of evidence prior to completing the work-based project and report • Advice in applying prior learning from all previous modules to the work place • Advice in choosing a suitable work based project on which to base your report

LEARNING AND TEACHING					
LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)					
Scheduled Learning and Teaching activities	90	Guided independent study	510	Placement/study abroad	0

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS		
Category	Hours of study time	Description
Scheduled Learning and Teaching	90	Interactive Lectures
Guided Independent Study	510	Work-based learning

ASSESSMENT			
FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade			
Form of Assessment	Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
Portfolio of Evidence	Approximately 2-3 projects- sufficient to address all ILOs. Once all KSBs have been evidenced then you may enter the End Point Assessment period as outlined below.	All	Written/Oral

SUMMATIVE ASSESSMENT (% of credit)					
Coursework	0	Written exams	0	Practical exams	100

DETAILS OF SUMMATIVE ASSESSMENT				
Form of Assessment	% of credit	Size of the assessment e.g. duration/length	ILOs assessed	Feedback method
End Point Assessment – Knowledge Test	0	60 Minutes, multiple choice. Assessed according the IfA Level 6 Data Science assessment plan. Grade: Pass/Fail, a minimum of 60% is required to pass.	Knowledge objectives listed in appendix A of the assessment plan.	
End Point Assessment – Report (based on the work based project)	50	7500 words (+- 10%). Assessed according the IfA Level 6 Data Science assessment plan. Grade: Distinction/Pass/Fail	Skills and Behaviours listed in appendix A of the assessment plan.	
End Point Assessment – Professional Discussion (based on the portfolio)	50	This can only be undertaken once the previous assessments are complete. Professional Discussion: 90 minutes (+- 10%). Assessed according the IfA Level 6 Data Science assessment plan. Grade: Distinction (Low/High) /Pass (Low/High) /Fail	All	

Overall Grading

Please note that it is a requirement of the End Point Assessment that the Knowledge Test be passed, but this is not used to determine the grade awarded for the apprenticeship qualification.

The Knowledge Test must be passed before you will be permitted to progress to the later assessments. Numerical equivalents for the purpose of classifying this module will be calculated using the table below.

Apprenticeship Classification	Knowledge Test	Report result	Professional Discussion	Module
Distinction	Pass	Distinction	High Distinction	100
	Pass	Distinction	Medium Distinction	85
	Pass	Distinction	Low Distinction	72
Merit	Pass	Pass	High Distinction	68
	Pass	Distinction	High Pass	68
	Pass	Pass	Medium Distinction	65
	Pass	Distinction	Medium Pass	65
	Pass	Pass	Low Distinction	62
	Pass	Distinction	Low Pass	62
Pass	Pass	Pass	High Pass	58
	Pass	Pass	Medium Pass	50
	Pass	Pass	Low Pass	42
Fail	Pass	Fail	High Distinction	38
	Pass	Distinction	Fail	35
	Pass	Fail	Medium Distinction	35
	Pass	Fail	Low Distinction	30
	Pass	Fail	High Pass	20
	Pass	Fail	Medium Pass	15
	Pass	Pass	Fail	15
	Pass	Fail	Low Pass	10
	Fail	N/A	N/A	0

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)			
Original form of assessment	Form of re-assessment	ILOs reassessed	Time scale for reassessment

RE-ASSESSMENT NOTES

As outlined on the apprenticeship standard assessment plan, the assessment must be taken within 12 months of the original EPA. Where you have been referred/deferred for the exam, you will have the opportunity to take a second exam in the August/September re-assessment period.

Deferral – if you miss an assessment for certificated reasons judged acceptable by the Mitigation Committee, you will normally be either deferred in the assessment or an extension may be granted. The mark given for a re-assessment taken as a result of deferral will not be capped and will be treated as it would be if it were your first attempt at the assessment.

Referral – if you have failed the module overall (i.e. a final overall module mark of less than 40%) you will be required to resit the assessment which you did not pass as described in the tables above. The mark given for a re-assessment will not be capped, but this it is not permitted to resit an assessment in which you have achieved a passing mark.

RESOURCES
INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type and level of information that you are expected to consult. Further guidance will be provided by the Module Convenor.

Indicative reading:

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Goodfellow, I et al. (2016). *Deep Learning*. Massachusetts Institute of Technology Cadle, J et al. (2014). *Business Analysis*. BCS, The Chartered Institute for IT; 3rd edition

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CREDIT VALUE	60	**ECTS VALUE**	30
PRE-REQUISITE MODULES	All		
CO-REQUISITE MODULES	None		
RCF LEVEL	6	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	20/05/2021	**LAST REVISION DATE**	Sept 2024
KEY WORDS SEARCH	Portfolio, Work-based evidence, Knowledge Test, Report, Professional Discussion		