Module Title	**Data Management**
Level	7
Reference No. *(showing level)*	CSI_7_DAT
Credit Value	20
Student Study Hours	Total: 200 Contact hours: 52 Student managed learning hours: 148 Requirements for Self-Managed Learning Hours: • Read research papers and make notes for seminar presentations. • Undertake research work, complete and write up lab exercises and assessments. • Maintain a journal on contemporary research and technical work.
Pre-requisite learning	None
Co-requisites	None
Excluded combinations	None
Module co-ordinator	
School/Division	Engineering/Computer Science and Informatics
Short Description	Data Management and Data Quality are increasingly at the heart of every commercial and research enterprise, as the value of data increases along with the need for adaptive security. This module will give you a critical and evaluative knowledge of the theory, practice and research of software engineering techniques for Data Management amid today's complex and changing business/commercial/research environments.
Aims	• To develop an in-depth, critically evaluative knowledge of skills required in a Data Management role; carry out a critically evaluative review of current Data Management literature/software/process developments, and research; developing skills as self-directed learner who can set goals and select appropriate knowledge, skills, etc... as well as specifying tools/techniques for a particular purpose. • Develop your ability to recognise and be able to respond in an appropriate way to opportunities for innovation in Data Management, as well as participating effectively in technology review and peer review processes. • Prepare you for a career in the Data Management community using appropriate processes to specify, design, deploy, verify and maintain Data Management and Big Data environments, including working with technical uncertainty, undertaking risk management associated with a range of activities. • Work as a member of a Data Management/Development team recognising the different roles within a team and different ways of organising teams while applying the principles of appropriate supporting disciplines for: investigating and defining a problem, identifying constraints, understanding customer/user needs, identifying and managing cost drivers, ensuring fitness for purpose and managing the design process, finally critically evaluating outcomes. .
Learning Outcomes	**Knowledge and Understanding:** On successful completion of this module, you will have knowledge and understanding of: • Demonstrating a systematic understanding of the domain of Data Management including the importance of research, methodologies, driving innovation and contribution; (covers course outcomes: a1, a2; BCS requirements: 7.1.1 - 7.1.4; 8.1.1 - 8.1.2; 8.2.1; 9.1.1, 9.1.2, 9.2.2; 10.1.1, 10.1.2, 10.2.1)

	• Consistently producing and reviewing research informed work which applies and is at the forefront of the developments in the domain; (covers course outcomes: a3; BCS requirements: 7.1.1, 7.1.4, 7.1.6; 8.1.1 - 8.2.1; 9.1.1 - 9.1.3) • Study and management of associated projects including timescales, risk identification/management, cost and quality constraints, as well as ethics working within professional frameworks and social/legal constraints (covers course outcomes: a4; BCS requirements: 7.1.5 - 7.1.9; 8.1.1 - 8.2.2 9.1.3 - 9.2.3; 10.1.1 - 10.2.3) **Intellectual Skills:** • Conduct a critically evaluative analysis of a case-based domain using appropriate analytic and quantitative methods; also developing the in-depth knowledge necessary to identify and apply suitable techniques to synthesize advanced theory/practical concepts. (covers course outcomes: b1, b2; BCS requirements: 8.1.1 - 8.2.1; 9.1.1 - 9.2.3; 10.1.1 - 10.1.3) • Specify/critically evaluate a project applying appropriate techniques, life-cycle/methodology; conducting effective independent research (covers course outcomes: b3, b4; BCS requirements: 8.1.1, 8.2.1, 8.2.2; 9.1.1, 9.1.2,10.1.1 - 10.1.3) **Practical Skills:** • Develop the in-depth knowledge necessary to identify Data Management project domains and apply suitable techniques in order to synthesize advanced (theory/practical) concepts to design, develop, deploy, and maintain bespoke/innovative Data Management/Big Data solutions; as well as being able to specify, manage, critically evaluate a project applying appropriate technology, techniques, life-cycle/methodology (covers course outcomes: c2, c4; BCS requirements: 8.2.1, 8.2.1; 9.2.1 - 9.2.3; 10.2.1 - 10.2.3) • Be able to make concise, engaging and well-structured oral presentations, arguments and explanations; Communication /presentation of advanced Data Management projects and concepts to a wide range of audiences. (covers course outcomes: c1, c3; BCS requirements: 8.2.1, 8.2.1; 9.1.1 - 9.2.3; 10.2.1 - 10.2.2) **Transferable Skills:** • Critically evaluate existing/emerging data quality/ data management technology and techniques, carrying out independent research, recognize and contribute to opportunities for innovation, deal with uncertainty, evaluate and manage risks, synthesise ideas/theories/solutions and report back appropriately to your peers, also conducting effective peer reviews. (covers course outcomes: d2, d3; BCS requirements: 7.1.1 - 7.1.4) • Self-manage your study time and work effectively to meet deadlines, select and evaluate appropriate knowledge, skills, etc...; also select and evaluate supporting resources/tools for a particular purpose, as well as being able to make effective contributions as team member/leader when required. (covers course outcomes: d1, d4; BCS requirements: 7.1.5 - 7.1.9)
Employability skills	There is a constant commercial need/demand for Data Management Specialists, Data Scientists, Data Analysts, Data Architects and Database Administrators with skills in the areas of Data Management, Data quality and Big Data solutions. The module delivers skills in these areas that are directly relevant in both commercial and research environments.
Teaching and learning pattern	All module teaching and learning content will be hosted on the University VLE giving constant access to all material maximising your learning potential. Weekly lectures will present fundamental topics and knowledge in the subject area. Lectures may feature presentations, Audio-Visual Media and Digital Content as appropriate. Guest lecturers may also be used where appropriate. Although a traditional single semester-based delivery mode is

	assumed, the module may also be provided in an intensive study/block mode 5-day delivery for short courses.
Supporting Tutorials	For each lecture an accompanying tutorial (also hosted on the VLE site) will provide the opportunity where possible to practice the design, software engineering and maintenance of practical solutions to problem domains. Practical exercises will focus on the application of industry standard techniques and tools using large real-world data sets where appropriate.
Indicative content	The following list of topics is indicative (not exhaustive) of typical module content: • Data Management: Historical and Contemporary Perspectives • Data Privacy / Data Quality Assurance/ Legal, Social, Ethical, Professional issues (LSEPI) • Master Data Management/Integration Strategies • Data Modelling: Relational(normalisation/entities)/Objects(classes) • SQL: Data Definition/Manipulation/Storage/Retrieval • SQL: Stored Procedures/Triggers/Business Logic • Data Security/ Database Administration/Auditing • Processing Semi-Structured and Unstructured Data (e.g., NoSQL/XML) • Cloud hosting / Web enabled Databases • Big Data and Data Warehousing
Assessment *Elements and weightings*	**100% Coursework (Summative assessments)** The coursework delivered in two components to run in parallel: (1) A case study-based scenario requiring applied design, development and implementation of practical software engineered solutions to Data / Database Management problem domains. Practical work will focus on the application of industry standard tools using scenarios and data sets where available, ensuring that you can demonstrate achievement of the learning outcomes. The prototype software engineered solution to be accompanied by a critical summary evaluation of the engineered solution. **Final report length: 3000 words (60% of coursework total)** (covers module outcomes: c1-c2, d1-d2; BCS requirements: 8.2.1, 8.2.1; 9.1.1 - 9.2.3; 10.2.1 - 10.2.2) (2) Conduct research on a suitable contemporary topic in the field of either: Data Management Strategy, Data Quality or Big Data and Advanced Manipulation Techniques. Access to a wide array of journal publications and other diverse learning and library resources are available via the Library Services and the VLE. This research will culminate in the production of an academic journal style paper on the chosen area, demonstrating a focussed, clear and critically evaluative understanding of the subject domain. **Final report length: 2000 words. (40% of coursework total)** (covers module outcomes: a1-3, b1-b2; BCS requirements: 7.1.1 - 7.1.9; 8.2.1, 8.2.1; 9.1.1 - 9.2.3; 10.2.1 - 10.2.2) (**Formative Assessments:** The students will usually be given a range of weekly tutorial-based tasks (both individual/group work) comprised of formative exercises imparting the knowledge and skills required to satisfy the learning outcomes)
Indicative Sources *(Reading lists)*	**Core Materials:** • Gordon, K. (2013) *Principles of Data Management: Facilitating Information Sharing*. BCS, The Chartered Institute for IT. 2nd edition. ISBN-13: 978-1780171845 • Kellenberger, K, Pollack, E (2019) *Expert T-SQL Window Functions in SQL Server 2019: The Hidden Secret to Fast Analytic and Reporting Queries A*press ISBN-13: 978-1484251966 • Kimball, R. and Ross, M. (2016) *The Kimball Group Reader: Relentlessly Practical Tools for Data Warehousing and Business*

	Intelligence: *Remastered Collection*, John Wiley and Sons Inc; 2nd edition, ISBN-13: 978-1119216315 **<u>Optional Materials:</u>** • Cadle, J; Eva, M; Hindle, K; Paul, D; Turner, P; Rollason, C; Yeates, D. (2014) *Business Analysis*, BCS, The Chartered Institute for IT; 3rd edition, ISBN-13: 978-1780172774 • Ladley, J. (2012) *Data Governance: How to Design, Deploy and Sustain an Effective Data Governance Program*, Morgan Kaufmann, ISBN-13: 978-0124158290 • W. N. Venables, D. M. Smith and the R Core Team (2016), *An Introduction to R: Notes on R: A Programming Environment for Data Analysis and Graphics*, https://cran.r-project.org/doc/manuals/R-intro.pdf **Online Resources:** • The Data Protection Act: https://www.gov.uk/data-protection/the-data-protection-act (visited: 17/03/2021) • Guide to data protection | ICO: https://ico.org.uk/for-organisations/guide-to-data-protection/ (visited: 17/03/2021) • Microsoft Security Centre: https://technet.microsoft.com/en-us/security/default.aspx (visited: 17/03/2021) • IT Governance Ltd: http://www.itgovernance.co.uk/ (visited: 17/03/2021) • R (binaries /packages and manuals): http://cran.r-project.org/ (visited: visited: 17/03/2021) • RStudio: https://www.rstudio.com/ (visited: 17/03/2021)