

Coventry University

**Faculty of Engineering, Environment and
Computing**

**School of Computing, Electronics and
Mathematics**

MSc Data Science EECT109

**POSTGRADUATE COURSE HANDBOOK
2021-2022**

Welcome from the Course Director

We would like to welcome all new and returning students to the School of Computing, Electronics and Mathematics at Coventry University. We hope that the coming year is enjoyable and productive for you all. The aim of this course handbook is to provide you with as much of the information as possible that you will need over the course of your studies. Whenever you have a course query, the first place you should look is in this handbook.

You will already have received a Faculty Student Handbook electronically when you completed your online enrolment, you can access this handbook via your Course Community in Aula or on the Student Portal. Please pay particular attention to this information as it outlines important University regulations that apply to all students.

If there is anything in this handbook or the Student Handbook that you do not understand or if you are unable to find the answer to your query, you should contact a member of staff. The section entitled 'Getting Help' will indicate who the most appropriate person to contact is.

I wish you every success in your studies.

Dr Mark Johnston

Course Director

Studying MSc Data Science at Coventry University

For the latest information about how Coventry is supporting your learning in these changing times, see the student portal at this link: <https://share.coventry.ac.uk/students/Pages/Index.aspx>

Data Science is a broad multidisciplinary field encompassing everything from cleaning data to deploying predictive models. This MSc Data Science conversion course (EECT109) is designed for students from diverse backgrounds to gain technical expertise in Data Science. Gaining useful insights from data involves all of logical thinking, technical skills and deep knowledge of the domain the data comes from. Graduates from Law, Finance, Marketing, Business, Creative Arts, Social Sciences, Health Sciences, Sports Science, Psychology, Geography, Biological Sciences and Engineering (to name a few) are best placed to analyse data from their own discipline and would bring a unique perspective (and set of questions) to a Data Science team. Therefore, this course is designed to support students with perhaps little previous experience of data analysis or computer programming to gain new skills such as working with databases, statistical thinking, programming in high-level languages, modelling, applying Data Science tools and packages, machine learning, information retrieval, data visualisation, and addressing the challenges of Big Data. These complement existing knowledge and skills from each student's undergraduate study or work experience, such as formulating questions, building arguments, writing reports, delivering presentations, creative problem solving, and a curiosity about data.

The key topics covered in the course are as follows. They reflect the building of technical knowledge from necessary foundations through to more advanced topics such as machine learning and current challenges such as technology for dealing with Big Data. Having studied these topics, a student will be well prepared for a career as a Data Scientist, either solo or as part of a team, and have the foundational knowledge to enable lifelong learning in this fast-moving technical field.

- Programming and software development in a high-level programming language such as Python.
- Data analytics, statistical modelling and programming with data.
- Mathematical foundations of data science such as modelling, linear algebra, and probability.
- Data management systems for structured and unstructured data.
- Big data management, distributed databases and data visualisation.
- Information retrieval and analysis of textual data.
- Machine learning algorithms for learning from data.
- Data science applications, tools, projects and current issues.

Educational Aims of the Programme

The information in this section has been extracted from the Course Specification Document – the full document is available [here](#).

COURSE AIMS

The aims of this MSc Data Science course are to:

- (1) Prepare students from diverse (non-computing) backgrounds for employment as part of a Data Science team or for further study in Data Science.
- (2) Establish depth of foundations in the design and development of computer software and in mathematical language, concepts and theory, sufficient for understanding the methods, algorithms and theoretical aspects of Data Science independently of the current state-of-the-art tools and technologies.
- (3) Build broad knowledge and understanding in core topics of Data Science including machine learning and Big Data.
- (4) Develop professional, practical and analytical skills across the data science project lifecycle in modelling and analysis of different types and scales of data and in applying modern Data Science tools and technologies.

MODULE AIMS

7143CEM Programming for Data Science (30 credits)

This module aims to provide a broad overview of data science and to develop essential skills in computer programming for data science applications. It will cover the nuts and bolts of procedural and object-oriented programming in a high-level programming language, including the design, development and testing of code. Case studies will be used to motivate and explore phases of the data science project lifecycle and give experience applying practical data science tools and high-level libraries to both structured and unstructured data.

7144CEM Principles of Data Science (30 credits)

While data science tools and technologies are evolving rapidly, this module aims to build foundational knowledge and understanding of the mathematical concepts, statistical models and data analytics skills at the heart of data science. In this module we will study and apply the mathematics of linear algebra and probability which are central to almost all areas of mathematics and data science. We will also study statistical models and apply analytical skills of exploratory data analysis to summarise, compare, visualise and test data. Throughout the module, we will apply software tools and high-level libraries to investigate and illustrate foundational ideas and develop further skills in data wrangling and analysis of real multivariate datasets.

7071CEM Information Retrieval (15 credits)

Information retrieval are among core knowledge driving some of the world's successful and high-tech businesses including Google, Facebook, and Twitter. In this module, students are exposed to a range of common information retrieval methods, from theory to practice. This module mainly emphasis text retrieval, covering only a brief outline of multimedia information retrieval. In addition, it emphasises data mining methods, especially for text classification and document clustering problems. Course works require implementation in a computer programming language.

7072CEM Machine Learning (15 credits)

This module provides students with an introduction to machine learning techniques, the associated concepts and applications. Machine learning is the process whereby systems learn by identifying structures and patterns within data. Machine learning has proved an important tool in various applications including data mining, games design, diagnosis and natural language processing. Machine learning covers a broad field of intelligent techniques and their associated algorithms, such as data preparation and pre-processing, reinforcement learning, supervised and unsupervised learning, classification and clustering, applications of machine learning and future developments.

7082CEM Big Data Management and Data Visualisation (15 credits)

Organisations and businesses are being inundated with very large volumes of data - structured and unstructured - on a daily basis. These data are too big and complex for processing and analysing them using well known traditional methods. This module aims to introduce students to the current management and visualisation methods for Big Data. Cutting edge techniques will be taught which will enable students to discover patterns, relationships and associations in big data sets.

Students will engage with the emerging critical issues within the context of traditional database management systems which make them unsuitable to process big data. Thus, the nature of big data, recognised by its volume, velocity and variety, which prevents analysis in the normal setting of a traditional database will be studied and advanced analytical techniques require to understand big data will be covered.

7086CEM Database Management Systems (15 credits)

The aim of this module is to provide students with a sound knowledge of the theoretical and practical underpinnings of data management systems in centralised and distributed environments. This module is motivated by the need to harness the potential of traditional systems and of modern schemes, which arose in response to the challenges posed by Big Data. The organisation and delivery of the module implements a two-pronged approach, through the investigation of data models and through the study and application of relational databases and NoSQL databases. The study of distributed frameworks such as Hadoop, and relevant distributed techniques such as sharding and replication, will provide further enhancement to the scope of the module.

7050CRB Entrepreneurial Practice (10 credits)

This module aims to provide students with a framework of knowledge and understanding of how to effectively lead and develop people in a strategic and entrepreneurial way whatever the Master's degree of specialisation they elect to follow. Students will explore for example, the influence and impact of leadership theories, culture, wellbeing, the principles of entrepreneurial practice and understand the different contexts in which entrepreneurship can flourish as well as the characteristics of entrepreneurial leadership within different types of organisational scenarios. Ultimately, students will be given the opportunity to develop strategic priorities for entrepreneurial leadership. Finally, the module requires students to reflect critically on their personal learning and development needs and how they work with others, from an ethical and professional standpoint to encourage their continuing professional development.

The question key to this module is: *What are the effective strategies that I can utilise in an inclusive and creative way to promote an entrepreneurial culture and practices within and outside organisations to enable an organisation to flourish?*

7150CEM Data Science Project (50 credits)

The project is intended to provide students with the opportunity to demonstrate competence in applying the concepts and skills acquired during the taught part of the course. Students will apply a level of intellectual rigor which is commensurate with the standard of their Masters level programme of study. The project may be a solution to a practical industry problem/ requirement or focus on a research topic. The module will allow investigation and research as core activities, leading to analysis, final summations and insightful recommendations.

The project will culminate in a comprehensive, thorough and professional report, documenting the conduct, approach and outcomes of the project, further supported with a critical review of the project conduct and management. It is intended that the module gives students an opportunity to show that they 'specialise' in the area of Data science which relevant and useful for future career prospects.

COURSE REQUIREMENTS

This section details the modules that you must pass to qualify for a named award. Remember that for all programmes you must also satisfy the general University requirements for the degree awards (see the Faculty Student Handbook).

The programme has been designed to operate over one year of full-time study (two years part-time). The taught modules are delivered over two semesters and are taught in a block mode, i.e., only one module is studied at a time over a condensed number of weeks.

Module Code	Module Name	Credits	Mandatory / Optional	Semester
7143CEM	Programming for Data Science	30	Mandatory	1
7144CEM	Principles of Data Science	30	Mandatory	1
7071CEM	Information Retrieval	15	Mandatory	2
7072CEM	Machine Learning	15	Mandatory	2
7082CEM	Big Data Management and Data Visualisation	15	Mandatory	2
7086CEM	Data Management Systems	15	Mandatory	2
7050CRB	Entrepreneurial Practice	10	Mandatory	3
7150CEM	Data Science Project	50	Mandatory	3

The awards are given as follows:

- MSc Data Science: the full curriculum (180 credits).
- Postgraduate Diploma in Data Science: 120 credits comprising all of the taught modules (excluding 7150CEM and 7050CRB).
- Postgraduate Certificate in Data Science: 60 credits comprising 7143CEM and 7144CEM.

PART-TIME STUDY

For part-time students, the sequence of modules taken needs to be discussed with the Course Director. Students would normally begin with 7143CEM.

ASSESSMENT CRITERIA

The Pass mark for modules is 40%. The overall module mark may comprise more than one component (e.g. coursework and exam). The individual module descriptors give the precise pass criteria and the weighting of the component marks that contribute to the overall module mark.

External Examiner(s)

External Examiners are appointed for all named University awards: this is common practice across the UK Higher Education sector. External Examiners ensure that academic standards are in line with national standards, scrutinise representative samples of module work and help to ensure fairness in the consideration of student progression and awards. They have the right to comment on all aspects of the assessment system and participate as full members of the assessment boards.

The External Examiner for your course is Dr Vegard Engen who works at Bournemouth University.

Copies of the External Examiner Reports can be found on the [Engineering, Environment and Computing Student Portal](#).

If you have any feedback on the reports please put them in writing and send them to FacultyRegistry.eec@coventry.ac.uk

Please do not communicate directly with the External Examiner in question.

Additional Support

Coventry University is committed to a policy of equality of opportunities and access, and recognises that students with a disability have an equal right of participation in higher education. The University will make reasonable adjustments, where necessary and feasible, to facilitate this.

In this provision students with a disability, whatever their impairment, are included.

All students with a disability should be able to participate fully as far as reasonably practical in the full range of academic, cultural and social activities available within the University.

Students with a disability should be encouraged to expect both equal treatment as individuals and that they and their work will be considered solely on merit.

Students are urged to disclose their disabilities on application and throughout their student life to facilitate appropriate support.

You can email the Learning Support Co-ordinator for the Faculty of Engineering, Environment and Computing at LearningSupport.EEC@coventry.ac.uk

Or, email the Faculty Registry Team for further information about Learning Support Tutors.

- School of Computing, Electronics and Mathematics (CEM)
CEM.FacultyRegistry.ec@coventry.ac.uk

Getting Help, Information and Contact Details

The Course Director is available to advise students on academic and pastoral issues and may refer students to other Faculty or central support services of the University where necessary. Overseas students may take advantage of services and guidance offered by the International Office.

GENERAL INFORMATION

Announcements will also be posted on Aula, so it is important that you check the Course Community Page and Module Pages regularly.

You will be provided with a University email address and password when you enrol. Please note that the University will ONLY communicate via your University email account. It is your responsibility as a student to check your account regularly.

UNIVERSITY INFORMATION POINTS

You will find a reception desk (University Information Point) in the Engineering and Computing Building and the Sir John Laing Building. This is your first point of contact for any questions, queries or problems that you may have. If they cannot answer your question they will be able to find or direct you to someone who can. The contact numbers for the Information Points are:

Engineering & Computing	024 7765 8888
Sir John Laing	024 7765 8166

FACULTY REGISTRY

The Faculty Registry Team manages your academic record at the University and can help answer course, module and assessment queries. They can also help you understand the University's academic processes, rules and regulations. They are responsible for authorising deferral and extension applications and can advise you about mitigation.

You can contact your Faculty Registry Team via the relevant email address below:

- School of Computing, Electronics and Mathematics (CEM)
CEM.FacultyRegistry.ec@coventry.ac.uk

For more specific enquires please email the following:

- acp.eec@coventry.ac.uk – for enquiries referring to any alleged cases of academic misconduct
- iea.eec@coventry.ac.uk – for enquiries referring to individual exam arrangements
- FacultyRegistry.eec@coventry.ac.uk – for enquiries referring to extension or deferral requests

When you email help the team to respond quickly by following these tips:

- The University can only respond to emails sent from Coventry University email accounts, so use your student email address;
- Put your name and SID number in the subject line of your email;
Put your **course** at the beginning of your message e.g. BEng Mechanical Engineering, BSc Computer Science, BEng Civil Engineering
- Keep your email as short and concise as possible;
- If you are unsure which email address to use then please email:
FacultyRegistry.eec@coventry.ac.uk

CONTACTING ACADEMIC STAFF

Staff in the School of Computing, Electronics and Computing will endeavour to deal promptly and efficiently with all problems or issues that you may have, whether academic or personal. For non-urgent enquiries you should make an appointment with the appropriate person (see below).

All staff in Engineering, Environment and Computing offer 'Theta Hours' during term time when they are available to see students. The following staff are involved in delivering the course.

Staff Name	Contact (Email)	Modules
Dr Mark Johnston <i>Course Director</i>	ad4039@coventry.ac.uk	7143CEM 7144CEM
Dr Rachid Anane Dr Marwan Fuad Dr Seyed Mousavi Prof Vasile Palade Dr Rochelle Sassman	csx220@coventry.ac.uk ad0263@coventry.ac.uk ad0204@coventry.ac.uk ab5839@coventry.ac.uk csx243@coventry.ac.uk	7086CEM 7082CEM 7071CEM 7072CEM 7150CEM

HELP WITH PERSONAL PROBLEMS

You will be allocated an Academic Personal Tutor, who is a member of academic staff, to whom you may refer for advice and help on personal and general academic issues. It is in your best interest to ensure that your personal tutor gets to know you as you may require your tutor's help on a number of occasions, for example in providing you with a reference.

You can also access support from the Health and Wellbeing team who are part of Student Services and are based in the Hub. They offer counselling and mental health support, there are disability and welfare advisors to talk to and also a medical centre where you can book to see a GP. See your Student Handbook or the Student Portal for more information on these support services.

HELP WITH ACADEMIC PROBLEMS

Your Course Director or Module Leader, is the person whom you should approach for guidance on specific issues relating to coursework or examinations, and on matters relating to the understanding, reading, or relevance of material associated with each module, etc.

HELP WITH ADMINISTRATIVE PROBLEMS

If you have a question or problem relating to your programme or concerning assessment regulations you should contact the Faculty Registry Team (see above).

Your student representatives can also raise issues or comments on your behalf. Student representation is a key element of academic life at Coventry University. Your views contribute to the design, running, quality and future shape of your course. For details of the student rep system or who the student reps are follow the link [here](#).

Online Learning

Aula is a simple to use, mobile-first teaching and learning experience platform. Interaction and conversation is built into Aula through the feed. The feed is where everyone on your course/modules can interact with each other, ask questions, share content and discuss topics. Aula is easy to navigate and wherever you are in Aula you are only ever one click away from the course and module information.

All courses have a course community space in Aula where your course director will provide essential course information and updates.

Every module within the University has a module space in Aula associated with it. To gain access to your Aula spaces you will need a username and password. You obtain your username immediately upon enrolment. Access to Aula is then available 24 hours after enrolling.

The online module spaces are a vital learning resource and it is essential to engage with your modules on Aula regularly through your mobile, laptop or desktop computer. The module spaces provide access to a wide range of resources and facilities together with the essential information for that module. Learning resources such as presentation slides or reading are generally made available by lecturers in advance of a teaching session.

Module assessment details and briefs are also on Aula. Coursework is also submitted online through Aula. Online assessments and tests are also run through links in Aula. All in all, the module spaces are a vital learning resource and it is essential that you incorporate Aula into your learning routine.

The Aula Feed is central to your learning experience. You can contact the module leader and other students studying the module through the discussion Feed, and also take part in activities, debates and discussion with other students. This is also the place where important announcements and notices are posted by the module leader.

It is important to remember that these are open postings (at least open to others taking the module or course) and the use of them must be appropriate. They are not general 'chat' rooms and should not be used as such. As these are academic postings, it is important that you write in normal, proper English, i.e. that you do not write in a style more commonly associated with text messaging. In addition, you should use a reasonably formal style of writing in your postings. If you have a complaint or problem, please think very carefully about how you discuss/raise this and remember that other students and staff are likely to respond more positively, if the problem/complaint is aired sensitively and for example, that you make requests, rather than demands

Regulations governing the use of ICT must be adhered to e.g.: General Regulations, [Appendix 4](#) IT Systems Acceptable Use Standard: Coventry University Higher Education Corporation

This includes the need for users to 'respect the rights of others and conduct themselves in a manner that does not interfere with or cause offence to others and not engage in any activity which denies reasonable services to others or wastes staff effort in dealing with the consequences' and to 'ensure that opinions and views expressed electronically do not discredit their subjects in any way which could damage their reputation'. It is not acceptable to use any university platforms as a venue to attack or defame staff or students. There are appropriate means by which to raise issues with a module (via the module leader, course directors, student representatives and student voice meetings). Staff reserve the right to delete, without warning or permission, entries that are considered offensive or inappropriate.

SOCIAL MEDIA

It is recognised that friendly relations between staff and students are important for a harmonious and constructive learning environment. The integrity of these relations, however, is paramount in an academic institution. Facebook and other forms of social media must be accepted as an informal and unofficial resource. Thus, it does not represent the University's views and must not be used as an alternative to official channels of information.

FACULTY AND UNIVERSITY LOGOS

Please note that the use of Faculty or University Logos is not permitted without prior permission from the appropriate University personnel. Please ask your Course Director for further guidance before use.

Other Important Information

STAFF STUDENT CODE OF PRACTICE

To maintain the high quality of the Faculties courses, and to ensure that all parties involved are clear about commitment and expectations, we expect staff and students to adhere to the following Code of Practice.

Students can expect staff to:

- provide clear and comprehensive Module Guides and Course Handbooks.
- adhere to the module timetable (other than in exceptional circumstances).
- provide high-quality, focused and research-based teaching.
- provide relevant supporting materials.
- provide guidance on additional reading.
- provide opportunities for active learning.
- mark and return assignments within an agreed time limit.
- be responsive to student feedback.
- be available for consultation during advertised office hours.
- provide full information on changes to deadlines and other important events as far in advance as possible.

Staff can expect students to:

- read Module Guides and the Course Handbook.
- be familiar with guidance on course requirements.
- avoid plagiarism/self plagiarism/collusion.
- attend all timetabled sessions.
- take responsibility for their own learning.
- read and engage with the materials provided.
- independently engage in pre-class and follow-up reading and activities where specified.
- respect assignment submission deadlines.
- provide early notification of any difficulties.
- ensure that all classes are free from unnecessary interruption.
- consult staff during office hours, but otherwise by appointment only.
- make appropriate use of available learning support resources including the Library, Aula and computer software.
- keep up to date with the latest information provided about their course and modules, especially via Aula and notice boards.