

Programme Specification

When printed this becomes an uncontrolled document.

PLEASE DO NOT ADD ANY PICTURES OR TABLES.

Please check the Programme Directory for the most up to date version:

[UG Programme Directory](#)

[PG Programme Directory](#)

Section 1 – regulatory details				
1.1	Awarding body	Wrexham University		
1.2	Teaching institution	Wrexham University		
1.3	Final award and programme title (Welsh and English)	MSc Gwyddor Data a Dadansoddi Data Mawr MSc Data Science and Big Data Analytics		
1.4	Exit awards and titles	Postgraduate Diploma in Data Science and Big Data Analytics Postgraduate Certificate in Data Science and Big Data Analytics		
1.5	Credit requirements	MSc Data Science and Big Data Analytics: 180 credits at Level 7 PGDip Data Science and Big Data Analytics: 120 credits at Level 7 PGCert Data Science and Big Data Analytics: 60 credits at Level 7		
1.6	Intake points	Sept Intake and Feb Intake for Postgraduate Programmes		
1.7	Mode of study	Full & part time		
1.8	Length of delivery	Full time – 1 year Part time – 2 years		
1.9	Location of delivery	Plas Coch Campus		
1.10	Mode of delivery	Full time	In person	
		Part time	In person	
1.11	Language of delivery	English		
1.12	Faculty	Faculty of Arts, Computing and Engineering (FACE)		
1.13	Subject area	Cyber Security and Computing		
1.14	HECoS Code	100370		
1.15	Suitable for applicants requiring a Student Visa?	Full time	In person	Yes
		Part time	In person	No
1.16	Is DBS check required on entry?	No		
1.17	Professional, Statutory or Regulatory Body (PSRB) accreditation	All programmes have been designed to align with the requirements of the British Computer Society (BCS) and accreditation will be sought in the next accreditation visit.		
		BSc (Hons) Cyber Security and MSc Cyber Security will be aspiring for NCSC degree accreditation at the next application window, date to be announced.		
		This information is correct at the time of validation, please refer to the PSRB register for current accreditation status. This information is correct at the time of validation, please refer to the PSRB register for current accreditation status.		

Section 1 – regulatory details		
1.18	Welsh Medium Provision	Although the programme team is not in a position to deliver module content through the medium of Welsh, students will be entitled to submit assessments in Welsh in line with university policy. The programmes will be delivered through the medium of English. Students are entitled to submit assessments in the medium of Welsh. The programme team will continue to work closely with the Welsh Medium Development team with a view to exploring further potential avenues for integration of Welsh medium delivery. One potential way forward is to promote the development of a bilingual culture to better support local/regional Welsh students. A starting place would be providing support for industrial placements in Welsh language medium. Core project modules can also be translated into Welsh to allow for better synchronisation with local/regional industry. The wider programme suite currently maintains a small portfolio of short courses. These also have the potential to be translated into Welsh. Additional short courses focus on language localisation for games could provide a platform for increased Welsh language awareness. As part of this revalidation process, it is the team's goal to support at least one complete module pathway through levels 4, 5 and 6 in the medium of Welsh, or at the very least with full Welsh translations of module materials.
1.19	External reference points	QAA Subject Benchmark Statement: Computing March 2022 https://www.qaa.ac.uk/the-quality-code/subject-benchmark-statements/computing Master's Degree Characteristics Statement https://www.qaa.ac.uk/en/the-quality-code/characteristics-statements/characteristics-statement-masters-degrees The Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies https://www.qaa.ac.uk/quality-code/qualifications-and-credit-frameworks
1.20	Derogation to Academic Regulations	N/A
1.21	Foundation Year route	N/A
1.22	Placement / Work based learning	N/A – no placement
1.23	Length and level of the placement	N/A
1.24	Collaborative arrangement	N/A

Section 2 – programme details

2.1 Aims of the programme

The MSc Data Science and Big Data Analytics program aims to develop graduates who are experts in the field of data science. The program covers a wide range of topics, including machine learning techniques, implementation and evaluation of data science approaches, tools, and techniques, analytical aspects of big data, finding patterns in data, making meaningful data-driven conclusions, and producing predictions.

Graduates of the program will be able to use their skills to solve a variety of problems in both the private and public sectors. For example, they could use their skills to analyse customer data to identify trends and improve marketing campaigns, develop predictive models to forecast demand for products or services, investigate fraud or other criminal activity, or improve public health by analysing data on disease outbreaks.

The program is rigorous and challenging, it provides students with the skills and knowledge they need to succeed in a rapidly growing field. Students will learn from an experienced faculty, conduct research, and gain hands-on experience with real-world data problems. In addition to the technical skills, graduates of the program will also develop strong communication and problem-solving skills. They will be able to communicate their findings to a variety of audiences, and they will be able to apply their skills to solve complex problems.

The MSc Data Science and Big Data Analytics will:

- **Cultivate a Research and Innovation Mindset:** Encourage students to develop a mindset focused on research and innovation, enabling them to contribute to the advancement of knowledge in the field of data science and data analytics.
- **Promote Critical Thinking:** Foster critical thinking skills among students, enabling them to analyse complex data problems and devise innovative solutions.
- **Enhance Technical Proficiency:** Equip students with the necessary technical skills and knowledge to effectively navigate and manipulate big data sets, employing advanced analytical techniques and tools.
- **Foster Collaborative Learning:** Encourage collaborative learning environments that enable students to engage in discussions, share insights, and collaborate on research projects, promoting a multidisciplinary approach to data science.
- **Develop Ethical Data Practices:** Instil an understanding of ethical considerations and responsible data handling practices, ensuring students are equipped to address ethical challenges and privacy concerns in the field of data science.
- **Bridge Theory and Practice:** Bridge the gap between theoretical concepts and practical applications by providing hands-on experiences, real-world case studies, and industry-relevant projects, allowing students to apply their knowledge to real-world scenarios.
- **Cultivate Communication Skills:** Develop effective communication skills, both written and verbal, to enable students to convey complex data findings and insights to diverse audiences in a clear and compelling manner.
- **Foster Lifelong Learning:** Promote a mindset of continuous learning and professional development, enabling graduates to stay abreast of evolving trends and technologies in the dynamic field of data science and big data analytics.

2.2 Programme structure and diagram, including delivery schedule

Full-time Programme Structure - September Intake

Level	Module Code	Module Title	Credit Value	Core/ Option	Delivery (i.e. semester 1,2)	Year of Study
7	COM754	Research Methods for Digital Technologies	20	Core	1	1
7	COM759	Applied Data Science	20	Core	1	1
7	COM713	Advanced Data Structures and Algorithm	20	Core	1	1
7	COM736	Database systems and Data Analytics	20	Core	2	1
7	COM762	Advanced Data Analysis and Visualisation	20	Core	2	1
7	COM763	Advanced Machine Learning	20	Core	2	1
7	COM752	Dissertation Project	60	Core	3	1

Full-time Programme Structure - February Intake

Level	Module Code	Module Title	Credit Value	Core/ Option	Delivery (i.e. semester 1,2)	Year of Study
7	COM762	Advanced Data Analysis and Visualisation	20	Core	Sem2	1
7	COM763	Advanced Machine Learning	20	Core	Sem2	1
7	COM736	Database systems and Data Analytics	20	Core	Sem2	1
7	COM754	Research Methods for Digital Technologies	20	Core	Sem1	2
7	COM713	Advanced Data Structures and Algorithm	20	Core	Sem1	2
7	COM759	Applied Data Science	20	Core	Sem1	2
7	COM752	Dissertation Project	60	Core	Sem2	2

Part-time Programme Structure

Level	Module Code	Module Title	Credit Value	Core/ Option	Delivery (i.e. semester 1,2)	Year of Study
7	COM754	Research Methods for Digital Technologies	20	Core	1	Y2
7	COM759	Applied Data Science	20	Core	1	Y1
7	COM713	Advanced Data Structures and Algorithm	20	Core	1	Y1
7	COM736	Database systems and Data Analytics	20	Core	2	Y1
7	COM762	Advanced Data Analysis and Visualisation	20	Core	2	Y1
7	COM763	Advanced Machine Learning	20	Core	2	Y2
7	COM752	Dissertation Project	60	Core	2 & 3	Y2

2.3 Programme Learning Outcomes										
No.	Learning Outcome	K	I	S	P	PG Cert (L7)	PG Dip (L7)	Masters (L7)	N/A	Optional Ref (PSRB standards)
1	Develop and demonstrate advanced knowledge and understandings of core concepts, theories and principles, within their specialisation.	☒	☐	☐	☐	☒	☒	☒	☐	The level in which students engage with the core concepts, principles, and theories common to a range of specialist roles within their subject area. SBS1 SBS4 BCS1
2	Acquire adept knowledge and competence in using a variety of techniques, technologies and tools that are essential for their subject area specialisation. Master the skills, techniques and tools within their field, demonstrating proficiency within their use.	☒	☐	☐	☐	☒	☒	☒	☐	The level of competence shown through a wider range of development tools and software that directly relate to the topic specialisation. SBS1 SBS4 BCS2, BCS4

2.3 Programme Learning Outcomes										
No.	Learning Outcome	K	I	S	P	PG Cert (L7)	PG Dip (L7)	Masters (L7)	N/A	Optional Ref (PSRB standards)
3	Conceptualise and critically evaluate subject specialisations within a team-based system skillset. Understand the different components of a system and/or project and understand how collaboration evolves.	☒	☐	☐	☐	☒	☒	☒	☐	The level of awareness of topic specialism within a team-based system skillset. SBS1 SBS5 BCS1, BCS3
4	Understand the social and ethical facets of the subject specialisations that includes ethical decision-making, privacy considerations, security measures, and responsible use of data, including the broader social impact of technology.	☒	☐	☐	☐	☒	☒	☒	☐	The level in which students engage with the wider context of their topic specialism and wider digital industries and they are related to ongoing practice. SBS1 SBS6 BCS1, BCS3
5	Make professional judgements in the selection of technologies or processes for eroding complex problems into manageable components, defining problem statements and identifying underlying issues or constraints.	☐	☒	☐	☐	☒	☒	☒	☐	The level in which students identify problems or requirements

2.3 Programme Learning Outcomes										
No.	Learning Outcome	K	I	S	P	PG Cert (L7)	PG Dip (L7)	Masters (L7)	N/A	Optional Ref (PSRB standards)
										and engage with solutions. SBS2 SBS3 BCS1, BCS3
6	Demonstrate professional levels in numeracy and literacy by way of analysing and interpreting technical information and applying computational thinking to tackle challenges effectively, so producing adept written reports and skilful oral communication.	☐	☒	☐	☐	☒	☒	☒	☐	The level of competence of numeracy, and literacy in the context of the computer science and digital industries. SBS1 SBS2 BCS1, BCS2
7	Critically evaluate specialist knowledge from a range of appropriate sources and clearly disseminate information through a range of advanced independent studies and academic research work.	☐	☒	☐	☐	☒	☒	☒	☐	The level in which students engage with critical thinking to collect and disseminate information though communication and academic work.

2.3 Programme Learning Outcomes										
No.	Learning Outcome	K	I	S	P	PG Cert (L7)	PG Dip (L7)	Masters (L7)	N/A	Optional Ref (PSRB standards)
										SBS2 SBS6 BCS1
8	Critically evaluate own digital practice and contemporary and emerging trends in the wider legal, professional, moral, social and ethical context. Understand the potential impact of technology on individuals and society and apply ethical principles in the decision-making process.	☐	☒	☐	☐	☒	☒	☒	☐	The level of self-awareness the student demonstrates in a digital context and their awareness of wider legal, professional, moral, social and ethical issues. SBS2 SBS6 BCS1, BCS3
9	Critically analyse the application of technology to a range of real-world problems particularly in industry and interdisciplinary research.	☐	☐	☒	☐	☒	☒	☒	☐	The level of competency demonstrated by the core skills of asset production and the associated tools, technologies, and strategies.

2.3 Programme Learning Outcomes										
No.	Learning Outcome	K	I	S	P	PG Cert (L7)	PG Dip (L7)	Masters (L7)	N/A	Optional Ref (PSRB standards)
										SBS1 SBS4 BCS2
10	Apply advanced skills and research-led specialist knowledge in the areas of machine learning and statistics to the design of software and data analyses	☐	☐	☒	☐	☒	☒	☒	☐	The level of computational problem solving as part of technical, mathematical, and logical data science contexts. SBS2 SBS4 BCS2
11	Design and program complex computer software and data products.	☐	☐	☒	☐	☒	☒	☒	☐	The level of practical skills demonstrated through the lifecycle of the Data Analytics process. SBS3 SBS4 BCS2, BCS4
12	Conceptualise and evaluate the importance of communication, social interaction and diversity within the	☐	☐	☐	☒	☒	☒	☒	☐	The level of awareness of the

2.3 Programme Learning Outcomes										
No.	Learning Outcome	K	I	S	P	PG Cert (L7)	PG Dip (L7)	Masters (L7)	N/A	Optional Ref (PSRB standards)
	computer and digital industries so enhancing employability and contribution to industry. Demonstrate professionalism in verbal and written postgraduate assessment.									importance of communication, social interaction, and diversity within wider computer and digital industries as a core employability skill. SBS5 SBS6 BCS1, BCS3
13	Critically evaluate and engage in opportunities to pursue entrepreneurial endeavours, contribute to innovation-driven organisation and create own ventures within the computer systems industry.	☐	☐	☐	☒	☒	☒	☒	☐	The awareness of professional and enterprising opportunities in relation to employability, computer systems and personal enterprise. SBS5 SBS6 BCS2, BCS3

2.3 Programme Learning Outcomes										
No.	Learning Outcome	K	I	S	P	PG Cert (L7)	PG Dip (L7)	Masters (L7)	N/A	Optional Ref (PSRB standards)
14	Critically evaluate alternate viewpoints and the opinions of others to enhance and defend postgraduate academic and project work.	☐	☐	☐	☒	☒	☒	☒	☐	The level of awareness of opinions of others and the demonstration of flexibility in considering alternate viewpoints. SBS5 SBS6 BCS2, BCS3
15	Devise, plan and deliver a large-scale, independent project that demonstrates structured organisation skills, professional learning and effective time-management.	☐	☐	☐	☒	☒	☒	☒	☐	The level of competence demonstrated through organisational skill, personal learning and time-management skills and how they relate to the wider computer science and digital industries. SBS2

2.3 Programme Learning Outcomes										
No.	Learning Outcome	K	I	S	P	PG Cert (L7)	PG Dip (L7)	Masters (L7)	N/A	Optional Ref (PSRB standards)
										SBS6 BCS2, BCS4

Note: K- Knowledge and understanding; I-Intellectual Skills; S-Subject Skills; P-Practical, professional and employability skills

2.4 Learning and teaching strategy

The proposed computing programme suite will adopt the Computing subject area model for Learning, Teaching and Assessment, which is underpinned by university-wide frameworks such as the Active Learning Framework (ALF) and the Strategy for Supporting Student Learning and Achievement (SSSLA). The programme suite is also designed to facilitate key outcomes for the delivery of Employability Skills and contemporary industry methods and tools to assist the student to become an independent learner while still supporting students in their transition to the workforce or postgraduate education. The curriculum is designed to encourage an appreciation for learning, to develop a professional work ethic enriched by current research, industrial engagement and the development of transferable skills.

Students within the programme suite will benefit from a number of core project modules that are designed to simulate the realities of cross-discipline industry practise alongside key subject-specific modules that facilitate theoretical and practical experience of working with a range of industry aligned tools and software.

Scheduled learning and teaching activities are broad and varied in nature to provide students with an enriched learning experience and may include attendance at active learning sessions, industry-focused guest talks, practical exercises and workshops.

The programme suite provides students with knowledge in several subject disciplines that support industry best-practice and real-world application of skills within the various computing discipline. Learning is supported with a multidisciplinary and research-based approach to learning with a focus on emerging technologies and theories to equip students with the skillsets required for the rapid future growth in this area.

The course provision is located on the Wrexham campus, including teaching rooms, lecture theatres, staff offices, and specialist labs. There are a number of specialist computer labs on the Wrexham campus and a new Cyber Innovation Academy providing industry and public service engagement and industry-leading, internationally recognised, certifications and accreditations within specialist computer science fields.

General purpose computing laboratories will also support the teaching activities as needed. The specialist labs offer access to a range of software that is utilised within the modules defined in the programmes and are key to the delivery of subject specialist content. Staff across the Computing department operate an Open-Door policy in relation to students, ensuring flexibility and responsiveness in dealing with queries and questions that occur outside of the scheduled teaching hours.

Online Community Platform:

Microsoft Teams is an industry online community management platform. The computing programme team has been using Microsoft teams since COVID-19 and is looking to utilise this platform and other technologies to develop a more vibrant online community which provides bespoke communication for all modules and other student feedback initiatives.

Moodle:

The Computing department has a long tradition of producing high quality online content in the support of teaching and learning. Students within the computing programme suite are heavily supported by a wide range of varied content including pre-recorded video content, interactive quizzes, discussion forums and other activities. Where practical, sessions are recorded and provided online.

Extensive use is made of the University's Virtual Learning Environment (VLE), Moodle, to provide students with access to a range of delivery, and supporting, materials related to each of the modules featured on the programme. In addition to the materials used during the taught sessions, the VLE is used to provide students with additional content such as quizzes, videos, audio recordings, external links, technical reports, research papers, and so forth. The VLE also provides students with the ability to communicate using discussion

2.4 Learning and teaching strategy

forums and is the platform primarily used in the issuing, submission, marking, and feedback of student assessment.

Play Space:

The Play Space is a bespoke project room and supporting technology store. Students are able to make use of the space for practical project work and are able to book key technology for use in research experiments, practical work and other project-related activities. Available technologies include motion capture, haptic feedback systems, eye tracking, heart monitors, galvanic skin response systems, laptops and other assorted hardware/peripherals.

Industry Engagement & Enterprise:

The computing department has implemented an enterprise strategy that focuses on various initiatives to enhance industry collaborations and educational engagement. The program suite actively supports industry events and collaborations throughout the year. Specifically, the Cyber Security program participates in World Skills UK Competitions and plans to expand its engagement to encompass a wider range of technology-based competitions. The department also collaborates with the Inspiring Skills Excellence in Wales project, working closely with both Higher Education (HE) and Further Education (FE) institutions in Wales to establish educational pathways from Key Stage 3 to degree level.

To address sector deficits, the department has established the Cyber-Innovation Academy, which takes a multidisciplinary approach to teaching and learning. The academy utilises gamified and project-based learning to develop a comprehensive set of skills alongside technological competencies, with a focus on industry and employability. The Cyber-Innovation Academy collaborates with industry engagement initiatives like Cyber Wales and EC-Council for industry-level certification and accreditation.

Through the Cyber Innovation Academy, the department will focus on collaboration and engagement, providing simulators and immersive environments for computing and computer security. The resources available will enable technical research, gamified learning, digital forensics, and business risk and mitigation. The innovative space encourages cross-disciplinary research projects, leveraging the full range of expertise within the department.

The department actively participates in the NCSC CyberFirst Schools Collaboration, which aims to inspire and nurture talented young individuals from diverse backgrounds to pursue careers in cybersecurity. Additionally, the department houses a cyber escape room within the Cyber-Innovation Academy, serving as a training facility for both students and industry professionals.

Promoting diversity in the tech industry, the department has established a North Wales chapter of Women in Tech in partnership with Cyber Wales and the South Wales Women in Cyber Cluster. This initiative aims to empower and support women in the field of cybersecurity.

Furthermore, the department is involved in Knowledge Transfer Partnerships (KTPs), which enables the department to collaborate with industry partners and facilitate the exchange of knowledge and expertise. Through KTPs, the department works closely with businesses and organizations to address real-world challenges and drive innovation in sectors relevant to its expertise.

Additionally, the department collaborates with other universities across Wales to deliver Technocamps, an innovative and impactful program aimed at inspiring and nurturing young minds in the field of technology. Technocamps extends its reach from Key Stage 1 to Key Stage 4 pupils, ensuring that students at various educational levels have access to the program's enriching activities and resources. By participating in

2.4 Learning and teaching strategy

Technocamps, the department actively contributes to the development of young people who are interested in developing STEM careers in the future.

In a joint effort with Technocamps and the Welsh Government, the department has also become a Minecraft education centre. This collaborative project aims to provide Continuous Professional Development (CPD) opportunities to teachers, equipping them with the necessary skills and knowledge to effectively incorporate Minecraft into their classrooms. By supporting educators in utilizing Minecraft as an educational tool, the department promotes interactive and engaging learning experiences for students, fostering creativity and problem-solving skills.

Furthermore, the department actively participates in the Cisco Academy and RedHat Academy programs. These partnerships provide students with valuable industry certifications and training, preparing them for careers in networking and cybersecurity. By aligning with leading technology companies like Cisco and RedHat, the department ensures that its curriculum remains up to date with the latest advancements in the field. Through these academy programs, students gain practical skills and knowledge, making them highly sought-after by employers in the industry.

These various partnerships and collaborations form a crucial part of the department's comprehensive enterprise strategy. By engaging with industry, educational institutions, and government bodies, the department fosters a dynamic environment that promotes innovation, industry connections, and educational excellence. These initiatives not only benefit students and teachers but also contribute to the growth and development of the regional economy by producing a skilled workforce equipped to meet the demands of the ever-evolving technology sector.

2.5 Assessment strategy

In line with ALF, innovative assessments strategies are used throughout the programmes and are always delivered in context and/or as part of portfolio building exercises to enhance student achievement and employability. Specifically, as part of all projects, students' achievement is tracked and managed through cloud-based systems. This not only delivers complete transparency of work allocations in student group projects but delivers an industry simulated environment which further enhances student awareness of the industry context of their work.

The modules assessment methods within the computing discipline put a strong emphasis on students' abilities and their mastery of specific skills or knowledge areas, which allows for a more tailored and individualised approach. To support students' learning, formative assessments are used throughout the module delivery, including activities such as self-reflection, peer assessments, and other effective feedback approaches.

For modules that are entirely assessed through coursework and portfolio-based assessment, milestone progress reviews are conducted as part of the formative assessment process, providing personalised feedback to students. These milestones not only offer support for the students' progress, but also help them to stay on track towards meeting the learning outcomes and achieving the intended deliverables of the module.

For modules that have an embedded industry-based certification there will be an opportunity for students to submit a coursework-based submission as a preparation to the final module assessment in order to obtain personalised feedback and monitor progress. The final assessment will be conducted in line with the requirements of the industry certification and may include a remote proctored in-class assessment.

2.5 Assessment strategy

Disclaimer

Throughout quality assurance processes we have ensured that this programme engages with and is aligned to:

- [Academic Regulations](#)
- [The University Skills Framework](#)
- [Welsh Language Policy](#)
- [Equality and Diversity Policy](#)
- [The Student Union offers support for students](#)

Section 3 – Programme set up (office use only)

3.1	Framework	FRAME046_SEP FRAME052_SEP FRAME073_SEP
3.2	Cost centre	GACP
3.3	Course type (HESA)	Choose an item.
3.4	Fee model	PGT: Fee Band B FT/PT (Fee as specified on website)
3.5	Are any modules taught over either multiple periods or across the HESA year (defined as running 1st August - 31st July)	Yes
3.6	Student funding model	SLC/Self Financed
3.7	Mode of Attendance (Funding)	In person attendance
3.8	Does the Suitability for Practice Procedure apply to the programme?	No
3.9	Programme Leader	Colin Kuka
3.10	Date of Approval	9 th Nov 2023
3.11	Date and type of Revision	April 2024 MSc Data Science and Big Data Analytics amendment of entry requirements (AM2) 04/12/2024 APSC approval to modify assessment on COM752 Sept 25 – Removed ADP702 Optional module from the Advance Practice pathways. Aug 26 – Part-time delivery schedule: a correction of semester delivery for COM713 from semester 2 in year 1 to semester 1 in year 1 and COM762 from semester 1 in year 1 to semester 2 in year 1. Additionally, a correction of the year of study for COM754 from year 1 to 2 and COM762 from 2 to 1 (AM0)