

**Welcome to Computing: Data Analytics**

**Extended Certificate in Data Analytics**

Career range – IT covers a wide range of industries so will be valuable in any career that you choose to progress onto. There are specialist units which will give you a good head start in marketing analysis,

**Extended Certificate**

The equivalent of 1 A level, typically taken alongside either another AAQ or 2 A levels to make up your program.

**Why should I study Data Analytics?**

**The Extended Certificate** course covers the topic of data in depth, which allows you to develop your knowledge and skills ready for a career in data analysis and its associated career strands. You will develop the kinds of skills and evaluative thinking that will stand you in good stead in competing for high level jobs. Data Analytics is a great way to enhance your understanding of how information is used in industry and why it is an essential ingredient to giving organizations that competitive edge.

**Assessment method** – a mix of internally assessed units and externally assessed units.

**What typical careers can I go onto?**

**Some of the Industries requiring data analysis skills include:**

Logistics, Building, Finance, Games, Retail, Farming, Armed Forces and NHS.

**Extended Certificate students typically go on to (when combined with your other subjects): University course, job or Degree Apprenticeship**

A selection of careers for this course includes: Data Analyst, Business Intelligence Analyst, Data Engineer, Quantitative Analyst, Marketing Analyst, Sports Analyst, Fraud Analyst.

Industry Links

|  |
| --- |
| **Our links this year for IT have included working with the local NHS Trust to develop mobile apps for Dr’s and nurses. This work placement partnership will continue this year with further opportunities for students to develop applications.** |

Summer work to complete

Some quizzes to get you thinking about the Internet of Everything:

For the quizzes – approximately 20 minutes)

**Quiz 1**

**🌐 Internet of Everything Mini Quiz**

**1. What does the “Everything” in Internet of Everything refer to?**
A. Only computers and smartphones
B. People, processes, data, and things
C. Just smart home devices
D. Social media platforms

**2. Which of the following is an example of IoE in healthcare?**
A. A smartwatch tracking your heart rate
B. A vending machine
C. A microwave oven
D. A gaming console

**3. What is a key difference between IoT (Internet of Things) and IoE?**
A. IoT includes people, IoE does not
B. IoE is only used in factories
C. IoE includes people, processes, data, and things
D. IoT is more advanced than IoE

**4. Which technology is most essential for IoE to function?**
A. Blockchain
B. Artificial Intelligence
C. Internet connectivity
D. 3D printing

**5. What is a potential risk of the Internet of Everything?**
A. Better communication
B. Increased privacy concerns
C. Fewer connected devices
D. Slower internet speeds

**Quiz 2**

**🌐 Internet of Everything Mini Quiz**

**1. Which of the following best describes the role of “processes” in the Internet of Everything?**
A. They refer to manufacturing workflows only
B. They ensure data is encrypted during transmission
C. They enable the right information to be delivered to the right person or device at the right time
D. They are the physical devices connected to the internet

**2. In a smart city powered by IoE, which of the following is an example of machine-to-machine (M2M) communication?**
A. A citizen reporting a pothole via an app
B. A traffic light adjusting based on real-time vehicle flow detected by sensors
C. A mayor reviewing a dashboard of city metrics
D. A pedestrian pressing a crosswalk button

**3. What is a major challenge in scaling IoE systems globally?**
A. Lack of interest from consumers
B. Too many available devices
C. Interoperability between different platforms and standards
D. Overuse of fiber optic cables

**4. Which protocol is commonly used for lightweight communication in IoE devices?**
A. HTTP
B. FTP
C. MQTT
D. SMTP

**5. How does edge computing enhance the performance of IoE systems?**
A. By storing all data in a central cloud server
B. By reducing the need for sensors
C. By processing data closer to the source, reducing latency
D. By increasing the number of connected devices

**Quiz 3**

**🌐 Internet of Everything Mini Quiz**

**1. A smart building adjusts lighting and temperature based on the number of people in a room and the time of day. What is this an example of?**
A. Human-to-human communication
B. Machine-to-machine communication
C. Manual control systems
D. Predictive maintenance

**2. A wearable fitness tracker collects your heart rate and sleep data, then syncs it to a mobile app where you can view trends. What IoE components are involved?**
A. People, data, and things
B. Only data and things
C. Just people and processes
D. Things and processes only

**3. A smart irrigation system uses weather forecasts and soil sensors to decide when and how much to water crops. What is the main benefit of this IoE application?**
A. Enhanced entertainment
B. Reduced labor costs
C. Optimized resource usage
D. Increased advertising reach

**4. A logistics company uses drones to deliver packages and updates customers in real time via an app. What type of interaction is primarily taking place?**
A. Human-to-machine
B. Machine-to-machine
C. Human-to-human
D. Cloud-to-cloud

**5. A hospital system automatically alerts a nurse when a patient’s vitals drop below a safe threshold, based on data from a wearable monitor. What role does the “process” play here?**
A. It stores the data in a database
B. It ensures the right data reaches the right person at the right time
C. It encrypts the data for security
D. It powers the wearable device

Task (approximately 1 hour)

Watch this video and answer the questions

[What is the Definition of the Internet of Things?](https://www.youtube.com/watch?v=qjn2SR2WlG4)

**Comprehension Questions on the Internet of Things (IoT)**

1. What does the term "Internet of Things" (IoT) refer to, and what are its main components?
2. Discuss the historical development of IoT. Who coined the term, and what was one of the first examples of connected devices?
3. Explain how IoT enhances efficiency and automation in various industries. Provide specific examples.
4. What are some of the key benefits of integrating IoT technology into everyday devices?
5. Identify and describe at least three challenges that IoT faces as it continues to evolve.
6. How does IoT facilitate data collection and processing in a smart home environment?
7. Discuss the significance of connectivity protocols in IoT. Why are they essential for the functionality of IoT systems?
8. What role do consumer IoT devices play in improving quality of life? Provide examples.
9. How are advancements in artificial intelligence and machine learning expected to impact the future of IoT?
10. Reflect on the potential ethical implications of widespread IoT adoption. What privacy concerns might arise?

**Relational Database (Approximately 1 hour)**

Try these exercises to get an understanding of database and MySQL:

[MySQL RDBMS - Relational Database Management System](https://www.w3schools.com/mysql/mysql_rdbms.asp)

**Research and answer the following questions on spreadsheet modelling (Approximately 1.5 hours):**

1. **Explain 3 ways that spreadsheets can support decision-making in business modeling, and what limitations might arise when handling complex or large-scale data?**
2. **Explain 3 ways that spreadsheets could be used instead of specialized business modeling software in terms of flexibility, cost, and ease of use?**
3. **Find 5 real-world examples where spreadsheet errors have led to significant business consequences, and what lessons can be learned from them?**
4. **How do features like formulas, pivot tables, and data visualization tools enhance or hinder the accuracy and clarity of business models in spreadsheets?**

Any queries? Email Andyh@Richuish.ac.uk (course manager) or ring the college on 01823 320800.

ANSWERS

Quiz 1 Answers

**✅ Answers:**

1. **B**
2. **A**
3. **C**
4. **C**
5. **B**

Quiz 2 Answers

**✅ Answers:**

1. **C**
2. **B**
3. **C**
4. **C**
5. **C**

Quiz 3 Answers

**✅ Answers:**

1. **B**
2. **A**
3. **C**
4. **B**
5. **B**

Internet Of Things (IoT) Video

**Answer Key:**

1. The Internet of Things refers to a network of interconnected physical devices embedded with sensors and software that collect and exchange data. (0:24)
2. The term was coined by Kevin Ashton in 1999, and one of the first examples was a Coke machine at Carnegie Mellon University in the early 1980s. (2:04)
3. IoT enhances efficiency by automating routine tasks, leading to time savings and reduced human error, such as in smart homes where devices like thermostats adjust automatically. (8:03)
4. Key benefits include improved efficiency, cost savings, enhanced quality of life, data-driven decision-making, and increased safety. (8:00)
5. Challenges include security risks due to more connected devices, significant privacy concerns, interoperability issues, scalability complexities, and the need for regulations. (8:44)
6. In a smart home, sensors collect data on temperature and motion, which is transmitted to the cloud for processing, allowing actions like adjusting the thermostat. (5:11)
7. Connectivity protocols like Wi-Fi and Bluetooth are essential for enabling communication between devices and centralized systems. (4:30)
8. Consumer IoT devices like smart thermostats and security systems improve convenience and enhance the overall quality of life for users. (6:15)
9. Advancements in AI and machine learning are expected to create more intelligent and autonomous IoT systems, leading to innovative applications. (9:36)
10. Ethical implications include concerns over data privacy and the potential for misuse of personal data collected by IoT devices. (8:57)