



Unit Title	Cloud Data Analysis and Visualisation (blended)
FHEQ Level	Level 6
Unit Code	CLC20303
Credit Value	15
Unit Type	Subject

Learning Hours			
Staff – Student Contact Hours		Independent Study Hours	
Classes	30	Independent study	90
Supervised access to Ravensbourne resources		Preparation for assessment	30
Total		150	

Unit Description

There are millions of data elements that can provide useful information to an organisation. Data analysis is conducted at every level of a modern organisation ranging from healthcare statistics to global warming and mobile networks. Effective communication makes a massive difference in the outcome of a project. Vast amounts of data published on reams of paper or shown on screen does not have an impact which a systematic and well design visually engaging content may provide.

According to a recent report 90% of available data was generated in past two years. Around 2.5 quintillion bytes of data created each day. With the fast pace adoption of IoT based devices, the data is multiplying at a rapid pace. Data could even be a spreadsheet or a small database residing on a local computer or in the cloud.

Data visualisation is not presentation of numbers in graphic format but an art that can use various forms to convey the message. This unit will cover the art of presentation and how data can be transformed into valuable and beautiful shapes.

Having large amounts data of is a complex process to depict Big Data and Data Lakes, data visualisation is used in order to understand the outcome of data. In order to analyse, model and show complex high dimensional data, a number of data visualisation techniques are used which will be covered in this unit. It will emphasize practical challenges involving complex real-world data and include case studies and hands-on work with the R programming language.

Along with practical activities, this unit will provide theoretical foundations of data analysis and various techniques to provide the same information in different visual formats.

The Five Principles underpin the Mindsets and Skillsets Manifesto and are the foundation upon which all course curriculum frameworks and unit specifications are based. The relevant Principles as stated below have been mapped against the Learning Outcomes relevant to each course unit and at each level (see Programme Specifications for full description of the Five Principles):

1. Cultivate / Where the individual thrives.
2. Collaborate / Where disciplines evolve.
3. Integrate / Where education engages industry.
4. Advocate / Where purpose meets practice.
5. Originate / creativity meets technology.

Unit Indicative Content

Data Analysis and Visualisation

- Cleaning, formatting and interrogating the data
- analysing and evaluating the results
- Importance of context
- Storytelling and visualisation
- Types of visualisation
- Data and storytelling
- Introductory Maths for data analysis
- Types of charts, graphs, infographics, dashboards
- Creative forms of data visualisation
- Advantages and disadvantages of data visuals
- Database systems
- Serverless computing
- Metadata repositories
- Cloud storage
- Elastic Search
- Analysis of real-time streaming data
- IoT telemetry data and Machine Learning
- Data Mining, Data Lakes, Big Data and Data Warehousing
- Data modelling
- Governance, auditing and reliability
- Cloud storage
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AWS knowledge areas

Data Analytics

- Athena
- ElasticSearch
- EMR
- Kinesis
- Quicksight
- Data Pipeline
- Redshift

Management

- CloudFormation
- CloudTrail
- CloudWatch
- SimpleWorkFlow (SWF)
- System Manager

Storage

- Elastic Block Storage (EBS)
- Elastic File System (EFS)
- Glacier
- S3

Unit Aims

1. To understand various forms of data and techniques of data analysis
2. To appreciate the need for data visualisation
3. To appraise advantages and disadvantages of data collection and visual information
4. To critically evaluate various methods of data presentation
5. To Evaluate the data processing techniques and their limitation
6. To be able to present data in creative art context

Unit Learning Outcomes

LO 1 Research/Inspiration

Select and evaluate information gathering techniques using a wide range of sources, providing visual, contextual and industry case-study research as appropriate.

Related Principle: ORIGINATE

LO 2 Concept/Ideation

Critically appraise and evaluate appropriate research materials to generate workable concepts or strategic project themes that inform and underpin project development. Related Principle: ORIGINATE

LO 4 (Pre) Production

Demonstrate systematic working knowledge, production skills, selection, application and understanding of a selection of processes, materials and methods that inform creative and academic practice.

Related Principle: COLLABORATE

LO 6 Critical and creative mindsets Evaluate a range of critical approaches in order to form an independent position

Related Principle: ORIGINATE

Learning and Teaching Methods

This unit will be delivered using a combination of:

- Lectures / Seminars
- Online activities
- Self-directed independent study
- Peer learning, group discussion, guest speakers

Assessment methods and tasks

Assessment tasks	Weighting (%) <i>(one grade or multi-grade unit)</i>
Artefact presentation (group)	100% holistic

Indicative Assessment Criteria

Identify and Apply data normalisation techniques to a raw form of data (LO1, LO2)
Appraise advantages and disadvantages of data collection techniques (LO2)
Discuss how visual information may be useful or misleading for decision making (LO2)
Apply various methods of data presentation and evaluate their effectiveness (LO 6)
Apply and evaluate various data processing techniques and discuss their limitations (LO 4)
Develop the outputs of your data in visual context and critically evaluate its advantages and disadvantage (LO 4)

Essential Reading list

Döbler, Mario, and Tim Grössmann. Data Visualization with Python: Create an Impact with Meaningful Data Insights Using Interactive and Engaging Visuals. Packt Publishing, 2019.

Embarak, Dr Ossama. Data Analysis and Visualization Using Python: Analyze Data to Create Visualizations for BI Systems. Apress, 2018.

Recommended reading list

Magnuson, Lauren. Data Visualization: a Guide to Visual Storytelling for Libraries. Rowman; Littlefield, 2016.

Guardian Data - <https://www.theguardian.com/technology/data-visualisation>

Information Is Beautiful: <https://informationisbeautiful.net/>

Maaik van Neck research <http://informform.com/about/>