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|--------------|--------------------------------------|
| Unit Title   | Cloud Computing Principles (blended) |
| FHEQ Level   | Level 4                              |
| Unit Code    | CLC20104                             |
| Credit Value | 30                                   |
| Unit Type    | Subject                              |

| Learning Hours (Blended)                    |    |                            |     |
|---------------------------------------------|----|----------------------------|-----|
| Staff – Student Contact Hours               |    | Independent Study Hours    |     |
| Classes                                     | 60 | Independent study          | 170 |
| Supervised access to Ravensbourne resources | 30 | Preparation for assessment | 40  |
| Total                                       |    | 300                        |     |

## Unit Description

Cloud computing has brought a revolution in how organisations take decisions about their computer infrastructure. The development environment, deployment techniques and infrastructure have all changed due to emergence of Software as a Service (SAAS), Platform as a Service (PAAS) and (Infrastructure as a Service) along with emerging hybrid models. IOT (Internet of Things) at industrial scale has further added a new dimension to the mix and comes with its own challenges.

This unit provides an overview of technologies and services that enable cloud computing, which shifts information systems from on-premises computing infrastructures to highly scalable internet architectures. The unit also explores different types of cloud computing models and the security and legal issues associated with cloud computing through hands-on activities.

Students will learn about various elements of Cloud Computing, virtualization and distributed systems along with physical system security and overall physical layer security.

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

#### Industry-wide Knowledge

- Various Cloud Service Models (SAAS, IAAS, PAAS)
- Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud.
- Open Source and Vendor Specific solutions for Cloud
- Network connectivity in Cloud
- Architecture/infrastructure Design
- Directory Service
- Distributed Systems
- Virtualisation
- Multi-Core technologies
- Vulnerabilities Assessment
- Data and Network Security

#### AWS Specific Knowledge Area

- API Gateway
- CloudFront
- Direct Connect
- Elastic Load Balancing
- Route 53
- API Gateway
- VPC
- EC2
- Beanstalk
- Elastic Container Service
- Lambda

#### CyBOK knowledge areas

- Physical Layer Security and Telecommunications
- Cyber-Physical Systems Security

## Unit Aims

To demonstrate an understanding of Cloud Computing architecture.

To evaluate various cloud models and how they may have an impact on IT strategy of the future.

To apply knowledge in cloud-based networking solutions.

To develop Cloud based directory services and demonstrate understanding of virtualisation and distributed computing.

To explain risks associated with telecommunications and physical layer security

To evaluate risk mitigation strategies associated with Physical System Security

## Unit Learning Outcomes

*(to be selected from the Mini Manual)*

LO 1 Research/Inspiration Demonstrate your capacity for 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

Generate first concept ideas or strategic project themes drawing upon reference to acquired research materials

Related Principle: ORIGINATE

LO 4 (Pre) Production

Identify, select and apply an appropriate selection of processes, materials and methods that inform creative and academic practice.

Related Principle: COLLABORATE

LO 6 Critical and creative mindsets Demonstrate enquiry into what makes good practice - both creatively and academically

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> ) |
|-------------------------|--------------------------------------------------------|
| Portfolio               | 60%                                                    |
| Individual Presentation | 40%                                                    |

### Indicative Assessment Criteria linked with programme LOs

Setup a cloud-based solution to demonstrate understanding of Cloud Computing Architecture for a given case study or scenario. (LO1)

Evaluate various cloud models and how they may have an impact on IT strategy of an organisation (LO6)

Using appropriate Cloud based platform, apply directory services and demonstrate understanding of virtualisation and distributed computing. (LO4)

Identify risks associated with telecommunications and physical layer security and explain how they could be mitigated (LO6)

Evaluate risk mitigation strategies associated with Physical System Security (LO 6)

### Essential Reading list

The Cyber Security Body of Knowledge. (2019). 1st ed. The National Cyber Security Centre.

Chandrasekaran, K. (2015) Essentials of Cloud Computing, CRC Press.

#### Recommended Reading

Stallings, W. (2017). *Network security essentials*. Boston [etc.]: Pearson.

Kapadia, A., Varma, S. and Rajana, K. (2014) Implementing Cloud Storage with OpenStack. Packt Publishing.