

### SYST: Blockchain Technology

| Module Title:   |   |          | Blockchain Technology   |  |  |
|---|---|----------|---|--|--|
| Language of Instruction:  |   | n:       | English   |  |  |
|   |   | 5        |   |  |  |
| oreuna.   |   | 5        |   |  |  |
| NFQ Level:  |   | 8        |   |  |  |
| Module Deli   | vered In  |          | 4 programme(s)  |  |  |
|   |   |          |   |  |  |
| Teaching & Learning<br>Strategies:  |   |          | The teaching and learning strategies used in the module are a combination of traditional lectures and laboratory exercises. The laboratory exercises include group work and peer review. The module covers a number of threshold concepts that are explicitly highlighted for the students. |  |  |
| Modulo Aim  |   |          | The module provides a broad upderstanding of blocksheins and distributed ledgers, including concernsus  |  |  |
| Module Aim:   |   |          | The module provides a broad understanding of blockchains and distributed ledgers, including consensus<br>protocols, digital assets, scalability and privacy. The module puts particular emphasis on practical skills and<br>blockchain implementations in real-life applications.           |  |  |
| Learning Ou   | itcomes   |          |   |  |  |
| On successfu  | ul completic  | on of th | his module the learner should be able to:   |  |  |
| LO1   | Understand and describe the most prevalent forms of blockchains and distributed ledgers, including their consensus protocols. |          |   |  |  |
| LO2   | _O2 Investigate and critically appraise the possible applications and use cases for blockchain technology.                    |          | critically appraise the possible applications and use cases for blockchain technology.  |  |  |
| LO3 Design and implement blockchain-based applications  |   | id imp   | lement blockchain-based applications that involve tokens, smart contracts and/or timestamping.  |  |  |
| Pre-requisite learning  |   |          |   |  |  |
| Module Recommendations<br>This is prior learning (or a practical skill) that is recommended before enrolment in this module.                |   |          |   |  |  |
| No recommendations listed   |   |          |   |  |  |
| <i>Incompatible Modules</i><br>These are modules which have learning outcomes that are too similar to the learning outcomes of this module. |   |          |   |  |  |
| No incompatible modules listed  |   |          |   |  |  |
| Co-requisite Modules  |   |          |   |  |  |
| No Co-requisite modules listed  |   |          |   |  |  |
| <b>Requirements</b><br>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.          |   |          |   |  |  |
| No requireme  | No requirements listed  |          |   |  |  |



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### **Module Content & Assessment**

### Indicative Content

### **Blockchain Taxonomies**

Decentralised vs. distributed vs. centralised systems, permissionless vs. permissioned systems

The Building Blocks of Blockchain Technology Peer-to-peer networks, gossip protocols, blocks and transactions, UTXO vs. account based transaction models, digital signatures, consensus protocols, proof-of-work, proof-of-stake, permissioned voting, Sybil attacks

Issuing and Managing Digital Assets Fungible tokens, e.g., currency, utility tokens, governance tokens, token economies; non-fungible tokens, e.g. certifications, collectibles, domain names; smart contracts; decentralised applications; oracles

Scalability and Privacy Payment channels, digital identity and pseudonymity

Other Applications Notarization, e.g., timestamping

| Assessment Breakdown  | %      |
|-----------------------|--------|
| Continuous Assessment | 25.00% |
| Project               | 50.00% |
| Practical             | 25.00% |

| Continuous Assessment     |   |                      |               |                    |  |
|---------------------------|---|----------------------|---------------|--------------------|--|
| Assessment<br>Type        | Assessment Description  | Outcome<br>addressed | % of<br>total | Assessment<br>Date |  |
| Short Answer<br>Questions | The students will answer a series of short questions that test their knowledge of consensus protocols, the issuance and management of digitals assets and real-world use cases. | 1,2                  | 25.00         | Week 7             |  |

| Project            |   |                      |               |                    |  |
|--------------------|---|----------------------|---------------|--------------------|--|
| Assessment<br>Type | Assessment Description  | Outcome<br>addressed | % of<br>total | Assessment<br>Date |  |
| Project            | The students will complete an individual project in the form of a decentralised application. The application will rely on a blockchain for some of its functionality. | 2,3                  | 50.00         | Week 12            |  |

| Pr       | Practical                           |  |                      |               |                     |  |
|----------|-------------------------------------|--|----------------------|---------------|---------------------|--|
| As       | ssessment Type                      | Assessment Description   | Outcome<br>addressed | % of<br>total | Assessment<br>Date  |  |
| Pr<br>E∖ | actical/Skills<br>valuation         | The students will complete weekly practicals and submit their work for assessment. | 1,2,3                | 25.00         | End-of-<br>Semester |  |
| _        |                                     |  |                      |               |                     |  |
| N        | No End of Module Formal Examination |  |                      |               |                     |  |

SETU Carlow Campus reserves the right to alter the nature and timings of assessment



### SYST: Blockchain Technology

# Module Workload

| Workload: Full Time  |                       |                                       |  |
|----------------------|-----------------------|---------------------------------------|--|
| Workload Type        | Frequency             | Average Weekly<br>Learner<br>Workload |  |
| Lecture              | 12 Weeks<br>per Stage | 1.00                                  |  |
| Laboratory           | 12 Weeks<br>per Stage | 2.00                                  |  |
| Independent Learning | 15 Weeks<br>per Stage | 5.93                                  |  |
|                      | Total Hours           | 125.00                                |  |

## Module Delivered In

| Programme Code | Programme  | Semester | Delivery         |
|----------------|--|----------|------------------|
| CW_KCCGD_B     | Bachelor of Science (Honours) in Computer Games Development                      | 8        | Group Elective 1 |
| CW_KCIAD_B     | Bachelor of Science (Honours) in Computing in Interactive Digital Art and Design | 8        | Elective         |
| CW_KCCYB_B     | Bachelor of Science (Honours) in Cyber Crime and IT Security                     | 8        | Elective         |
| CW_KCSOF_B     | Bachelor of Science (Honours) in Software Development                            | 8        | Group Elective 1 |