SYST: Blockchain Technology

Module Title:	Blockchain Technology
Language of Instruction:	English

Credits:	5

NFQ Level:	8

Module Delivered In	4 programme(s)

Teaching & Learning 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.

Module Aim:	The module provides a broad understanding of blockchains and distributed ledgers, including consensus protocols, digital assets, scalability and privacy. The module puts particular emphasis on practical skills and blockchain implementations in real-life applications.

Learning Outcomes	
On successful completion of this 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	Investigate and critically appraise the possible applications and use cases for blockchain technology.
LO3	Design and implement blockchain-based applications that involve tokens, smart contracts and/or timestamping.

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *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
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
No requirements listed

SYST: Blockchain Technology

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 Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Short Answer 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 Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment 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

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	The students will complete weekly practicals and submit their work for assessment.	1,2,3	25.00	End-of-Semester

No End of Module Formal Examination

ITCarlow reserves the right to alter the nature and timings of assessment

SYST: Blockchain Technology

Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	12 Weeks per Stage	1.00
Laboratory	12 Weeks per Stage	2.00
Independent Learning	15 Weeks 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