H8BLF: Blockchain Foundations

Module Code:	H8BLF
Long Title	Blockchain Foundations APPROVED
Title	Blockchain Foundations
Module Level:	LEVEL 8
EQF Level:	6
EHEA Level:	First Cycle
Credits:	10
Module Coordinator:	
Module Author:	Alex Courtney
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	MSc degree in Computer Science. Experience Lecturing, work experience or projects in the specific domain

Learning Outcomes	
On successful completion of this module the learner will be able to:	
#	**Learning Outcome Description**
LO1	Investigate Blockchain Technologies, Core Components, & Current State of the art use cases.
LO2	Distinguish the variations, protocols, challenges & ongoing disruptive nature of Blockchain Technologies.
LO3	Compose & Build while critically evaluating blockchain applications and infrastructure.
LO4	Demonstrate a concise understanding Blockchain technologies & its corresponding impacts on existing processes and industries.

Dependencies	
Module Recommendations	
No recommendations listed	
Co-requisite Modules	
No Co-requisite modules listed	
Entry requirements	Learners should have attained the knowledge, skills and competence gained from stage 3 of the BSc (Hons) in Computing.

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Module Content & Assessment

Indicative Content

Foundations of Blockchain Technologies
The History of Blockchain and Cryptocurrencies. Types of Blockchain. Brief: Blockchain Stack and Core Components

Blockchain Publications in Academia
Foundational Academic Literature - White Papers (BTC/ETH). Blockchain for Education

Blockchain Stack and Core Components
Block Composition - Cross Section of Components. Consensus Mechanisms (POET/POB/POS/POW). Proof of Elapsed Time / Burn / Stake / Work etc. DLT - Distributed Ledger Technology. Hashing - Merkle Tree

Blockchain Management
Decentralization. Brewer's CAP. Public, Private & Enterprise

Blockchain & Cryptocurrencies
The Current Exchange. Storing and Using Cryptocurrencies. Mining. Recent Trends and Developments:. Libre / BitCash / LiteCoin / ETH / BTC

Current State of Blockchain
Existing and Emerging Use Cases. A Thorough Study: Evolution & Revolution. Evolution Thus Far (BitCoin/HyperLedger/Ethereum/Monero/Tor)

Security, Identity & Cryptography in Blockchain
Cryptography - revision. Confidentiality, Integrity & Authentication. Symmetric & Asymmetric. Non-Repudiation. Public & Private Keys

The Blockchain Identity
Merkle , Back, Chaum & CypherPunks. Secure Hashing Algorithm –. Hash Functions. Digital Signatures vs Anonymity

Blockchain Applications
Bitcoin: Overview of Bitcoin System. Transactions / P2P Network / Blocks. Ethereum: Overview of Ethereum System. EVM / Smart Contracts / DevOps / DApps

Development in Blockchain
Development of a DApp - Tools. Blockchain API's

Blockchain Use Cases, Business and Legal Aspects
Cryptourbanomics - The Use of Blockchain in Urban Development. Economy & Business. Legal Aspects within the Public Sector

The Future for Blockchain
Institutional Initiatives for Blockchain. The Future for Blockchain

Assessment Breakdown	%
Coursework	40.00%
End of Module Assessment	60.00%

Assessments

Full Time

Coursework

Assessment Type:	Formative Assessment	**% of total:**	Non-Marked
Assessment Date:	n/a	**Outcome addressed:**	1,2,3,4
Non-Marked:	Yes		

Assessment Description:
Formative assessment will be provided on the in-class individual or group activities.

Assessment Type:	Continuous Assessment	**% of total:**	40
Assessment Date:	Week 10	**Outcome addressed:**	1,2,3,4
Non-Marked:	No		

Assessment Description:
Literary Review of White Papers supporting blockchain inception and developments. Within this assessment is also the task to understand current Use Cases and for the student to identify and document other potential implementations and use cases of Blockchain technologies. e.g. Bitcoin / Ethereum / Monero / Libre White Papers e.g. Use Cases / Medical / Supply Chain / Audit Framework / Financial Markets / Consumer Markets

End of Module Assessment

Assessment Type:	Terminal Exam	**% of total:**	60
Assessment Date:	End-of-Semester	**Outcome addressed:**	1,2,3,4
Non-Marked:	No		

Assessment Description:
End of semester examination.

No Workplace Assessment

Reassessment Requirement

Repeat examination
Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

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Module Workload				
Module Target Workload Hours 0 Hours				
Workload: Full Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Classroom & Demonstrations (hours)	24	Every Week	24.00
Tutorial	Other hours (Practical/Tutorial)	24	Every Week	24.00
Independent Learning	Independent learning (hours)	202	Every Week	202.00
			Total Weekly Contact Hours	48.00
Workload: Part Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	No Description	24	Per Semester	2.00
Tutorial	No Description	36	Per Semester	3.00
Independent Learning	No Description	190	Per Semester	15.83
			Total Weekly Contact Hours	5.00

Module Resources

Recommended Book Resources

Andreas M. Antonopoulos,Gavin Wood. (2018), Mastering Ethereum, O'Reilly Media, p.384, [ISBN: 9781491971949].

Andreas M. Antonopoulos. (2016), Mastering Bitcoin, O'Reilly Media, p.330, [ISBN: 9781491954386].

Imran Bashir. Mastering Blockchain, [ISBN: 978-1788839044].

Ethereum White Paper Butlerin, V. (0), Ethereum White Paper: A next-generation smart contract and decentralized application platform, https://github.com/ethereum/wiki/wiki/White-Paper.

Bitcoin White Paper. (0), Bitcoin: A Peer-to-Peer Electronic Cash System, https://bitcoin.org/bitcoin.pdf.

Supplementary Book Resources

Igor Pejic. (2019), Blockchain Babel, Kogan Page, p.288, [ISBN: 978-0749484163].

Article/Paper List.

Type.

Item.

Hal Finney.. (2004), , Reusable PoW, n/a, https://cryptome, htm, org/rpow.

Wei Dai. (0), B-Money, n/a, http://www.weidai.com/bmoney.txt.

Eric Hughes.. (1993), , A Cypherpunk's Manifesto, https://www, net/cypherpunk/manifesto, activism.

Dr Adam Back.. (1997), , Hashcash, http://www, org/papers/announce, hashcash.

This module does not have any article/paper resources

This module does not have any other resources

Discussion Note: