

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	
<i>On successful completion of this module the learner will be able to:</i>	
#	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 <i>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.</i>			
Reassessment Description 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	
<i>Recommended Book Resources</i>	
<p>Andreas M. Antonopoulos, Gavin Wood. (2018), Mastering Ethereum, O'Reilly Media, p.384, [ISBN: 9781491971949].</p> <p>Andreas M. Antonopoulos. (2016), Mastering Bitcoin, O'Reilly Media, p.330, [ISBN: 9781491954386].</p> <p>Imran Bashir. Mastering Blockchain, [ISBN: 978-1788839044].</p> <p>Ethereum White Paper Buterin, V. (0), Ethereum White Paper: A next-generation smart contract and decentralized application platform, https://github.com/ethereum/wiki/wiki/White-Paper.</p> <p>Bitcoin White Paper. (0), Bitcoin: A Peer-to-Peer Electronic Cash System, https://bitcoin.org/bitcoin.pdf.</p>	
<i>Supplementary Book Resources</i>	
<p>Igor Pejic. (2019), Blockchain Babel, Kogan Page, p.288, [ISBN: 978-0749484163].</p> <p>Article/Paper List.</p> <p>Type.</p> <p>Item.</p> <p>Hal Finney.. (2004), , Reusable PoW, n/a, https://cryptome.org/rpow.</p> <p>Wei Dai. (0), B-Money, n/a, http://www.weidai.com/bmoney.txt.</p> <p>Eric Hughes.. (1993), , A Cypherpunk's Manifesto, https://www.net/cypherpunk/manifesto, activism.</p> <p>Dr Adam Back.. (1997), , Hashcash, http://www.org/papers/announce, hashcash.</p>	
<i>This module does not have any article/paper resources</i>	
<i>This module does not have any other resources</i>	
Discussion Note:	