H8BCAD: Blockchain Application Development

Module Code:	H8BCAD
Long Title	Blockchain Application Development APPROVED
Title	Blockchain Application Development
Module Level:	LEVEL 8
EQF Level:	6
EHEA Level:	First Cycle
Credits:	5
Module Coordinator:	
Module Author:	Isabel O'Connor
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	Master's and/or PhD degree in computing or cognate discipline. May have industry experience also.

Learning Outcomes

On successful completion of this module the learner will be able to:

#	Learning Outcome Description
LO1	Investigate the technical workings of Blockchain Technologies
LO2	Develop and gain exposure to Distributed Applications on Blockchain Infrastructures
LO3	Investigate possible use cases, new and existing, for applications on Blockchain
LO4	Develop and Devise a Blockchain Application its infrastructure and implementation

Dependencies

Module Recommendations

No recommendations listed

Co-requisite Modules

No Co-requisite modules listed

Entry requirements	See section 4.2 Entry procedures and criteria for the programme including procedures recognition of prior learning.

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Module Content & Assessment

Indicative Content
Blockchain Variations Architecture Review. Generic Elements of a Blockchain. How a Blockchain Works. Benefits and Limitations
Types of Blockchain Distributed Ledger Technology. Public & Private Blockchain. Semiprivate. Side chains. Permission Ledgers. Tokenized Blockchain
Decentralization Decentralization using Blockchain. Methods and Routes to Decentralization. Decentralized Organizations. Platforms for Decentralization. Ethereum / Maidsafe / Lisk
Introducing Bitcoin Overview of the Bitcoin system. The Bitcoin P2P network - Sending Payments. Bitcoin Transactions - Life Cycle. Types of Transactions. Fees
Bitcoin Network & Payments The Bitcoin Network. The Wallets. Bitcoin Payments. Innovation in Bitcoin. Bitcoin Clients & APIs - Setting up a Node and Clients. Testnet. Bitcoin Limitations
Alternative Coins & Foundations Proofs of Works. Stakes.. Difficulty Algorithms. Namecoin. Litecoin. Primecoin. Zcash. ICOs & ERC20
Introducing Ethereum & Smart Contracts The Ethereum Network. Components of the Ethereum Eco System. Programming Languages - Runtime. Genesis. Gas. Mining. Wallets and Client Softwares. Smart Contracts
The Ethereum Development Environment Test Networks. Setting up a private Net. Development Tools and Frameworks.. MetaMask. Ganache. Truffle.. Solidity - Value Types / Arrays / Variables
Introducing Web3 Smart Contract Deployment. HTML & JavaScript Frontend. Development Frameworks - Truffle. IPFS - Decentralized Storage
Current Landscape What's Next / Emerging Trends. Limitations & Challenges. Blockchain Research

Assessment Breakdown	%
Coursework	50.00%
End of Module Assessment	50.00%

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:**	50
Assessment Date:	n/a	**Outcome addressed:**	1,2,3,4
Non-Marked:	No		

Assessment Description:
This will encompass the use of solidity coding language for the Ethereum Blockchain Infrastructure as well as the development of a proficient front end using a platform of choosing e.g. Web3 js / Ruby on Rails / ASP.Net

End of Module Assessment

Assessment Type:	Terminal Exam	**% of total:**	50
Assessment Date:	End-of-Semester	**Outcome addressed:**	1,2,3
Non-Marked:	No		

Assessment Description:
Covering Theoretical aspects of Topic

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	Per Semester	2.00
Tutorial	Other hours (Practical/Tutorial)	36	Per Semester	3.00
Independent Learning	Independent learning (hours)	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].

Hal Finney.. (2004), , Reuseable PoW, https://cryptome, htm, org/rpow.

Wei Dai -Money, 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.

Buterin, VEthereum White Paper: A next-generation smart contract and decentralized application platform, Ethereum White Paperhttps://github.com/ethereum/wiki/wiki/White-Paper.

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

Supplementary Book Resources

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

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

This module does not have any article/paper resources

This module does not have any other resources

Discussion Note:	