H8EFC: Edge and Fog Computing

Module Code:	H8EFC
Long Title	Edge and Fog Computing APPROVED
Title	Edge and Fog Computing
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	Explore research, frameworks, applications in edge and fog computing.
LO2	Review underlying technologies, limitations, and challenges along with future research direction and discuss generic conceptual framework for optimization problems in fog computing.
LO3	Analyse the restrictions introduced by the General Data Protection Regulation (GDPR), and discuss how these legal constraints affect the design and operation of IoT applications in fog and cloud environments.
LO4	Design and develop simulation scenarios for Edge and Fog Computing using network simulator.

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

Edge and Fog Computing – Foundations
Internet of Things (IoT) and New Computing Paradigms . Addressing the challenges in Federating Edge Resources

Edge and Fog Computing – Foundations
Integrating IoT + Fog + Cloud Infrastructures: System Modelling and Research Challenges

Edge and Fog Computing – Foundations
Management and Orchestration of Network slices in 5G, Fog, Edge and Clouds . Optimization problems in Fog and Edge Computing

Middleware
Middleware for Fog and Edge Computing: Design Issues . A Lightweight Container Middleware for Edge Cloud Architectures

Middleware
Data Management in Fog Computing

Middleware
Predictive analysis to develop to support Fog Application Deployment

Middleware
Using Machine Learning (ML) for protecting the security and privacy of IoT Systems

Applications and Issues
Fog Computing Realization for Big Data Analytics. Exploiting Fog Computing in Health Monitoring.

Applications and Issues
Smart Surveillance Video Stream Processing at the Edge for RealTime Human Objects Tracking. Fog Computing Model for Evolving Smart Transportation Applications.

Applications and Issues
Testing Perspectives of FogBased IoT Applications. Legal Aspects of Operating IoT Applications in the Fog.

Model & Simulate Edge and Fog computing
Model Fog and Edge Computing Environments Using network simulator toolkit (such as iFogSim, Ns3, OMNeT++, NetSim etc..,)

Model & Simulate Edge and Fog computing
Simulate Fog and Edge Computing Environments Using network simulator Toolkit (such as iFogSim, Ns3, OMNeT++, NetSim etc..,)

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:	Project	**% of total:**	40
Assessment Date:	n/a	**Outcome addressed:**	4
Non-Marked:	No		

Assessment Description:
Model and simulate fog environment scenario that can be simulated through iFogSim. This enables the learner to gain a deep understanding of the edge and fog computing.

End of Module Assessment

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

Assessment Description:
End-of-Semester Final 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.

Reassessment Description
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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)	24	Per Semester	2.00
Independent Learning	Independent learning (hours)	77	Per Semester	6.42
			Total Weekly Contact Hours	4.00

Module Target Workload Hours 0 Hours

Workload: Full Time

Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload

Module Resources

Recommended Book Resources

Satish Narayana Srirama, Rajkumar Buyya,. (2019), , Fog and Edge Computing : Principles and Paradigms ,Wiley ,.

Supplementary Book Resources

Abdulrahman Yarali,. (2018), , Cloud, Fog, and Edge: Technologies and Trends in Telecommunications Industry (Computer Science, Technology and Applications), Nova Science Pub Inc].

Mahmood, Zaigham,. (2018), , Fog Computing Concepts, Frameworks and Technologies,Springer.

Rahmaní, A., Liljeberg, P., Preden, J.-S., Jantsch, A.,. (2018), , Fog Computing in the Internet of Things Intelligence at the Edge,Springer.

This module does not have any article/paper resources

This module does not have any other resources

Discussion Note: