

AUTO C3601: Network Programmability and Automation

Module Title:			Network Programmability and Automation		
Language o	f Instruction		English		
Language of motifaction		•			
Credits:		5			
NFQ Level:		7			
Module Deli			F (-)		
	vered in		5 programme(s)		
Teaching & Strategies:	Learning		Combination of lectures and practical laboratory sessions. Lectures will take the form of traditional theory and tutorials. Laboratory sessions take the form of individual & group work.		
Module Aim	:		To provide the student with: 1. the skills necessary to automate and program networks. 2. apply software- defined networking principles. 3. Apply DevOps principles to network management		
Learning Ou	itcomes				
On successf	ul completion	n of th	is module the learner should be able to:		
LO1	Relate how SNMP and		mation impacts network management and compare DevOps techniques to traditional techniques, such as		
LO2	Identify cha data.	aracte	ristics of RESTful based APIs (CRUD, HTTP verbs, data encoding), interpret and manipulate JSON encoded		
LO3	Classify an	d em	ploy DevOps tools for IT automation.		
LO4	Relate Clou	ud, Vi	rtualisation and Containerisation as the foundation for Software-Defined Networking (SDN)		
LO5	Build Contr	oller-	based Software-Defined Networks and compare to traditional networks.		
Pre-requisit	e learning				
Module Rec This is prior l			tical skill) that is recommended before enrolment in this module.		
No recomme	ndations liste	ed			
	Incompatible Modules These are modules which have learning outcomes that are too similar to the learning outcomes of this module.				
No incompat	No incompatible modules listed				
Co-requisite	Co-requisite Modules				
No Co-requis	No Co-requisite modules listed				
	Requirements This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.				

Python programming and GNU/Linux system administration



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Module Content & Assessment

Indicative Content

DevOps and network automation

How network automation impacts network management. Syntax, JavaScript Object Notation (JSON), Extensible Markup Language (XML), YAML Ain't Markup Language (YAML), Object representation, Key/Value pairs.

RESTful APIs

Client/server, Stateless, Cacheable. Uniform Resource Identifier (URI) representation, HTTP methods. Authentication. Create, Read, Update, Delete (CRUD).

Configuration Management Tools Ansible, Chef, Puppet, Python modules such as the Netmiko Library for SSH access, NETCONF.

Virtualisation and Containerisation

Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), Virtual Machines, Containers, Hypervisor, Virtual Switches, Virtual Network Infrastructure (VNI)

Software-Defined Networking (SDN)

Data, Control, and Management Planes, SDN Controllers, North-Bound Interface (NBI), South-Bound Interface (SBI), OpenFlow, Mininet, Cisco Application Centric Infrastructure (ACI).

Assessment Breakdown	%
Continuous Assessment	40.00%
Project	20.00%
Practical	40.00%

Continuous Assessment						
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date		
Multiple Choice Questions	MCQ 1: The students will be given an MCQ to assess their knowledge of DevOps, RESTful API and JSON.	1,2,3	20.00	n/a		
Multiple Choice Questions	MCQ 2: The students will be given an MCQ to assess their knowledge of SDN and SDN programmability.	4,5	20.00	n/a		

Project					
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date	
Project	Each learner will receive a Scenario-based problem to solve and describe their solution via presentation and demonstration.	1,2,3,4,5	20.00	n/a	

Practical					
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date	
Practical/Skills Evaluation	Two practical examinations to demonstrate the achievement of the learning outcomes.	1,2,3,4,5	40.00	n/a	

No End of Module Formal Examination

Continuous Assessment					
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date	
Multiple Choice Questions	MCQ 1: The students will be given an MCQ to assess their knowledge of DevOps, RESTful API and JSON.	1,2,3	20.00	n/a	
Multiple Choice Questions	MCQ 2: The students will be given an MCQ to assess their knowledge of SDN and SDN programmability.	4,5	20.00	n/a	

Project				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	Each learner will receive a Scenario-based problem to solve and describe their solution via presentation and demonstration.	1,2,3,4,5	20.00	n/a

Practical						
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date		
Practical/Skills Evaluation	Two practical examinations to demonstrate the achievement of the learning outcomes.	1,2,3,4,5	40.00	n/a		
No End of Module Formal Examination						

SETU Carlow Campus reserves the right to alter the nature and timings of assessment



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Module Workload

Workload: Full Time		
Workload Type	Frequency	Average Weekly Learner Workload
Lecture	Every Week	3.00
Laboratory	Every Week	2.00
Independent Learning Time	Every Week	5.00
	Total Hours	10.00

Module Delivered In

			1
Programme Code	Programme	Semester	Delivery
CW_EEBEE_B	Bachelor of Engineering (Honours) in Biomedical Electronics	6	Elective
CW_EESYS_B	Bachelor of Engineering (Honours) in Electronic Engineering	6	Elective
CW_EEROB_B	Bachelor of Engineering (Honours) in Robotics and Automated Systems	6	Elective
CW_EEBEE_D	Bachelor of Engineering in Biomedical Electronics	6	Mandatory
CW_EEROO_D	Bachelor of Engineering in Robotics and Automated Systems	6	Mandatory