PG Diploma in Cloud Computing (Certified Cloud Computing & Network Engineer)

Preamble:

Business @ the speed of thought has moved from a buzzword to a business reality owing to the integration of business and technology. Digital infrastructures and information networks have become central to any business activity. The information residing on these computers, networks and in cloud are an essential asset and due care should be taken for its security. The impact of any loss of this asset or any downtime of the infrastructure is quite high with the proliferation of easy-to-use tools and open how-to-discussions, the number of people aiming to hack in to or bring down the network is high, both in this country and abroad. Hence, there is a need for heightened security measures to protect both infrastructure and data.

Objective:

The Course is aimed at molding candidates to Skilled System/Cloud Engineer with Information Security knowledge to maintain the Systems, Networks and cloud infrastructure in today's scenario. It is emphasizing on latest technologies so as to secure most coveted jobs in cloud driven industry.

Expected Job Roles

- System Engineer
- Network Engineer
- Cloud Engineer
- Cloud Architect

Duration:

720 Hours - (Theory: 154 hrs + Practical: 356 hrs+ Project: 210hrs)

This course shall be offered as full-time intensive course.

Course Outline:

Sl. No	Module Title	Duration (Hours)			Credits	
		Theory	Lab	Total	Theory (hrs/15)	Lab (hrs/30)
1	Introduction to Network Management	20	45	65	1	2
2	Introduction to Windows & Linux Server	25	60	85	2	2
3	Advanced Linux Server	30	65	95	2	2
4	Virtualization	15	40	55	1	1

5	**Cloud Computing with SaaS & PaaS Cloud**	20	45	65	1	2
6	**Infrastructure using OpenStack, XenServer & vSphere**	26	60	86	2	2
7	**Cloud Security**	18	41	59	1	1
8	**Project**	10	200	210	1	7
	Total Duration/Credits	**164**	**556**	**720**	**30**	

Prerequisites:

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Eligibility:

BE / B.Tech, MCA, MSc / BSc (IT / Computer Science /Electronics) or equivalent of any of these. Students undergoing BTech are also eligible, however they will be issued course certificate only on production of their degree certificate

Detailed Syllabus and Learning Outcome:

S. No	Chapter Name	Course Outline		Duration (Hours)		Learning Outcome
				Theory	Lab	
1	**Module1 - Introduction to Network Management**	1.1 Introduction to ISO & TCP/IP Stack 1.2 DNS/UDP/IP 1.3 TCP/HTTP 1.4 HTTPS 1.5 ICMP/DHCP 1.6 Cabling 1.7 Addressing - IPV4 & IPV6 1.8 Managing Basic Switches 1.9 Managing Advanced Switches 1.10 Managing Basic Routers		20	45	After completion of this module, the candidate will be able to : • Carry out Networking Fundamental analysis using Wireshark • Carry out the method of network cabling and testing

2	**Module 2 - Introduction to Windows & Linux Server**	2.1 Installing Windows Server 2.2 Setting Active Directory 2.3 Managing Active Directory 2.4 Managing User & Group 2.5 Setting File, Web Server 2.6 Backup and Restore 2.7 Introduction to Linux Fundamentals & Commands 2.8 Advanced Linux Commands		25	60	After learning this module the participant will be able to • Carry out configuration reviews of Windows Server administration • Carry out configuration reviews of Linux Server administration and testing commands
3.	**Module3 - Advanced Linux Server**	3.1 Configuring DNS Server 3.2 Configuring Web Server with Authentication and Virtual Hosting 3.3 Configuring MySQL Server 3.4 Configuring Mail Server 3.5 Configuring File Servers 3.6 Web Server with Joomla 3.7 SAMBA and NFS Server 3.8 Squid Proxy Server 3.9 Squid Proxy Server with E2guardian 3.10 Cryptography		30	65	After completion of this module the participants will be able to • Configure DNS Server • Configure Web Server with Authentication and Virtual Hosting • Configure MySQL Server • Configure Mail Server • Configure File Servers • Configure SAMBA and NFS Server • Configure Squid

		with Open Cryptool 3.11 PKI with PGP				Proxy Server • Configure Squid Proxy Server with E2guardian
4.	**Module4 - Virtualization**	4.1 Configuring Virtual Box 4.2 Configuring VMware 4.3 Configuring KVM Server 4.4 Configuring Xen 4.5 Configuring Hyper-V 4.6 Deploying Vagrant 4.7 Setting Linux Container -Docker 4.8 Configuring Open Storage 4.9 Configuring Open vSwitch		15	40	After attending this module the participants will be able to • Carry out configuration reviews for full Virtualization server deployment • Carry out configuration reviews for Para Virtualization server deployment • Carry out testing of Dockers and Containers
5	**Module5 - Cloud Computing with SaaS & PaaS Cloud**	5.1 Introduction to Cloud Computing 5.2 Types of Cloud Services 5.3 Introduction to SaaS Cloud 5.4 SaaS Cloud Deployment with Open Source Tools 5.5 Introduction to PaaS		20	45	After attending this module the participants will be able to • Carry out understanding of Cloud Types • Carry out

		Cloud 5.6 PaaS Cloud Deployment with Google App Engine 5.7 PaaS Cloud Deployment with OpenShift 5.8 PaaS Cloud Deployment with Bluemix 5.9 LAMP/WAMP with Own Cloud				configuration reviews of SaaS Deployment • Carry out configuration reviews and testing of PaaS Deployment
6	**Module6 - Cloud Infrastructure using OpenStack, XenServer & vSphere**	6.1 Introduction to IaaS Cloud 6.2 Types of Cloud Deployment with Xen/KVM 6.3 Setting Private Cloud with OpenStack 6.4 Setting Private Cloud with XenServer and XVP 6.5 Setting Private Cloud with vSphere 6.6 VMware vSphere Deployment 6.7 VMware vCenter Deployment 6.8 Introduction to AWS 6.9 AWS EC2 6.10 AWS S3 6.11 AWS VPC		26	60	After attending this module the participants will be able to • Carry out understanding of types of IaaS cloud • Carry out configuration reviews and testing of XenServer Deployment • Carry out configuration reviews and testing of vSphere Deployment • Carry out testing of AWS Deployment
7	**Module7 -**	7.1 Access Control Types		18	41	After attending this

	Cloud Security	7.2 Cryptography and Algorithm Analysis 7.3 MBSA & IPSec 7.4 Cloud Monitoring 7.5 NagiOS Server 7.6 IDS with Snort 7.7 Cloud Auditing 7.8 OpenVAS Server 7.9 Cloud Automation 7.10 Cloud Security Best Practices 7.11 Cloud Standards 7.12 Wi-Fi Setup with WEP & WPA				module the participants will be able to • Carry out understanding of Information Security Concepts • Carry out configuration reviews and testing of Cloud Server Monitoring • Carry out testing of Cloud Server Auditing
8.	**Module-8 Project**	8.1 The participants will be doing a live project with proper guidance from faculties		10	200	After completion of the project students will • Develop their knowledge, skills and competence of cloud server deployment and management
Total Hours = 720				**164**	**556**	

Examination & Certification:

NIELIT's NSQF Examination system will be followed for Examination & Certification.

Sl No	Examination Pattern	Modules Covered	Duration in Minutes	Maximum Marks

1	Theory Paper – 1	1,2,3	90	100
2	Theory Paper – 2	4,5	90	100
3	Theory Paper – 3	6,7	90	100
4	Practical -1	1,2,3	180	90
5	Practical -2	4,5,6,7	180	90
6	Internal Assessment	All modules	-	60
7	Project/Presentation /Assignment	8	-	60
8	Major Project/Dissertation	8	-	100
	Total			**700**

Note:

1. Pass percentage would be 50% marks in each component, with aggregate pass percentage of 50% and above.
2. Grading will be as under:

Grade	**S**	**A**	**B**	**C**	**D**
Marks Range (in %)	>=85%	>=75%-<85%	>=65%-<75%	>=55%-<65%	>=50%-<55%

3. Theory examination would be conducted online and the paper comprise of MCQ and each question will carry 1 mark.
4. Practical examination/Internal Assessment/ Project/Presentation/Assignment would be evaluated internally.
5. Major Project/Dissertation would be evaluated preferably by External / Subject Expert including NIELIT Officials.
6. Candidate may apply for re-examination within the validity of registration.
7. The examinations would be conducted in English Language only.

Recommended hardware/software tools:

1. High end Servers and client machines
2. SaaS, PaaS and IaaS open source cloud servers
3. Software's which include various flavors of Windows and Linux Operating Systems like Windows, RedHat Enterprise Linux/CentOS 6/7, RT Linux, OpenStack, CloudStack, OpenVAS/Nesses and various commercial and open source development tools, database and cloud servers..

Faculty & Support / Lab Instructor:

1. Two Faculties B.Tech (CS/IT/EC) /MCA or equivalent with programming knowledge and relevant experience

2. One Support / Lab Instructor with at least Diploma in (CS/IT/EC) /BCA or equivalent with programming knowledge and relevant experience

References:

1. Cloud Computing: Principles and Paradigms, Rajkumar Buyya, James Broberg, Andrzej M. Goscinski
2. Brief Guide to Cloud Computing, Christopher Barnett
3. Handbook on Cloud Computing, Borivoje Furht
4. Virtualization--the complete cornerstone guide to virtualization best practices by Ivanka Menken, Gerard Blokdijk
5. Virtualization: From the Desktop to the Enterprise By Chris Wolf, Erick M.
6. Cloud Computing Security: Foundations and Challenges. Vacca
7. Cloud Computing: Implementation, Management, and Security, Rittinghouse, J.W. & Ransome
8. The Basics Of Cloud Computing: Understanding The Fundamentals Of Cloud Computing In Theory And Practice, Rountree, D. & Castrillo
9. Cryptography & Network Security, Stallings
10. Textbook on Cyber Law by Duggal Pavan
11. Cyber Security by Nina Godbole , Sunit Belapure
12. Cloud Computing Explained – John Rhoton
13. Cloud Computing Bible, Barrie Sosinsky
14. Cloud Application Architectures - George Reese
15. Enterprise Cloud Computing: A strategy Guide for Business and Technology Leaders, Andy Mulholland
16. Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, & IaaS), Michael J. Kavis
17. Building the Infrastructure for Cloud Security, Raghuram Yeluri
18. AWS for Dummies, Bernard Golden

Course Name	PG Diploma in Cloud Computing (Certified Cloud Computing & Network Engineer)	**Vertical**	Cloud Computing
Course Code		**Rev No**	R4
Prepared By	Mrs Sini S Nair	**Aligned NSQF Level**	8
NIELIT Centre	Calicut	**Last Revised on**	03.06.2019