Diploma Program in

‘Cloud Computing’

Duration: 32 weeks (160 hours)

Sr. No.	Name of the Programme	Details About the Programme	Remarks
1.	**Diploma course in 'Cloud Computing'**	**Mission of AIIITS:** The mission of AIIITS is to advance knowledge and educate students in information Technology and other areas that will best serve the nation. **Vision of AIIITS:** To position AIIITS as a premier institute responsive to emerging needs of industry. To produce high skilled graduates and contribute towards sustainable development of the industry and nation.	
		1. Introduction to the Programme: Cloud Computing in short is IT-as-a-service. Cloud computing is on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. The term is generally used to describe data centers available to many users over the Internet. Large clouds, predominant today, often have functions distributed over multiple locations from central servers. "Cloud computing" was popularized with Amazon.com releasing its Elastic Compute Cloud product in 2006, references to the phrase "cloud computing" appeared as early as 1996. The course aims at utilizing fully the capabilities of the free and open source software. The participants will get hands-on training and after adopting the skills included in the program can become an asset to the industry. **2. Objectives of the Programme:** The key objectives of this program are for participants to be able to understand the concepts, characteristics, delivery models and benefits of cloud computing. Understand the key technologies behind the Cloud Computing, which covers Networking, Server, Virtualization of Server, Cloud Services and management of IT infrastructure. With the completion of this program, the students will be in a position to understand the necessary theoretical background for cloud computing and storage cloud environments. Also they will learn the concepts practically as if they are working in the production environment. The course aims at imparting relevant skills in networking, managing servers and manage IT	

		infrastructures remotely. Also Cloud Computing is one of the most demanding skills looked for in industry. With lockdown and as companies are moving into Work from Home mode, has increased the demand for the Cloud computing skills. **<u>Objectives:</u> the objectives of the proposed course are to impart knowledge on the following:** 1. Developing concepts of Networking and become skilled to manage network in enterprise environment. 2. Developing capabilities to install, configure and manage Servers (Windows and Linux). 3. Develop skills to virtualize servers and manage virtual machines and IT infrastructure. 4. Learn how to deploy applications and IT infrastructure on Cloud and manage it remotely.	
		3. Target Group of Learners: Cloud computing program covers the technologies required to create a Cloud infrastructure and manage it. Fresher and young engineers or graduates looking for a career in IT infrastructure management services (ITMS) or anyone having experience in ITMS can join this programs for upgrading their skills which will lead them to an enhanced career. Major IT companies are using these technologies to reduce their operating costs and lot of investments are also being made in these technologies so there is a growing demand for the skills covered in this program. It also helps to build a promising career in every aspects.	
		4. Instructional Design: The course will consist of live lectures and assignments for every modules. After every module doubt-clearing sessions will be arranged where students will be free to discuss their doubts. Sessions for Interview preparation will be covered after the completion of all the modules.	

5. Instructional Design:

i. **Duration of the Programme: 8** months

ii. **Course delivery**

The course will be entirely delivered ***online or offline.*** There are six modules in the course which will be conducted by expert faculties having experience and expertise in respective technologies. Each week's menu will cover the following:

1. **Interactive lectures:** These sessions will be conducted in Classroom or on Microsoft team or Google meet or Zoom in case situation arises. The session link will be shared with the students.
2. **Lecture(s):** the theoretical and applied parts of the topic will be covered in lectures.
3. **Exercises and data:** Assignments will be allocated to the participants which they need to complete and submit and assessments on any particular module will be done based on the assignments.
4. **Doubt-clearing:** There will be an interactive forum as a platform to interact with each other and with the resource persons**.** Here the participants can discuss their difficulties, can ask questions and get the doubts clarified.

6. Eligibility:

Students with any bachelor's/Master's degree from any recognized universities in India or other countries.

7. Scheme and Evaluation:

There would be three types of assessment for evaluating the performance of the participants - short and long answer questions, multiple type questions and practical exercises.

Each participant will be given assignments and projects. After completion of the training, online examination will be conducted and Certificate will be jointly issued by AIIITS and Jain University only after completion of all the assignments, project and after qualifying the exam.

		8. Procedure for admission, Curriculum transaction and evaluation: Admission will be based on prerequisite degree of any recognized universities in India. The Course is affiliated to the Jain University.	
		9. <u>Fee structure:</u> The fees should be paid in lump sum or in installment only, before the commencement of the course*. Rs. 58000/- *Installment options can be provided with additional 8% on the course fees. The students can pay it in 4 easy installments	
		<u>10. Syllabus:</u> **<u>Topic 1:</u>** CCNA- Fundamentals of Networking, Basic Networking Concepts, Enterprise Network, Components of a Network Characteristics of a Network, Types of Network, Network Topology, OSI Reference Model and TCP/IP Protocol Suite, TCP/IP Protocol Suite, Transfer Control Protocol (TCP), Different functions of TCP, Functions of Internet Layer Protocol, Routed and Routing Protocol, Characteristics of Internet Protocol (IP), Function of DNS and DHCP, MAC Address, Packet delivery process, Defining Unicast, Multicast and Broadcast, Exploring Packet Delivery Process, Network Security, Wireless Network Technologies, Advantages of Wireless Network Difference between LAN and WLAN, WLAN standards, Wireless LAN Security Threats And Mitigation, Association of Wireless clients with Access Point, Access Point Configuration steps, Wireless LAN issues and Troubleshooting, LAN Switching, Different Switching Modes, Switching Operation, Operating Cisco IOS, Internetwork Operating System (IOS), Accessing the Command Line Interface (CLI), User and Privileged Executive Modes, IOS Command line History, Starting up a Switch and CLI, Powering up a Switch, Ethernet Switch Configuration, Different Switch Configuration Sub-Modes, Viewing the configuration, Interface Configuration of a Switch, Configuring the Switch for Remote Access, Configuring a Switch for Telnet, Configuring a Switch for SSH, Port Security, Port Security Configuration, IP Subnetting, Subnet Masks, Subnetting Calculation, Starting a Router, Initial Setup, Logging in the Router CLI, Overview of Router Commands, Router Configuration and Verification, EIGRP, Advanced Switching Technology, Network Address Translation (NAT), IPV 6, Header Format, IP	

		address Representation, IPV6 address types, Assigning IPV6, IPV6 routing, IPV6 tunneling, Advanced Wide Area Network. (Duration-4 Weeks) **<u>Topic 2:</u> Microsoft Server-** Installing & Configuring Windows Server, Deploying and Managing Windows Server, Introduction to Active Directory Domain Services, Managing Active Directory Domain Services Objects, Automating Active Directory Domain, Services Administration, Implementing Ipv4, Implementing DHCP, Implementing DNS, Implementing Ipv6, Implementing Local Storage, Implementing File and Print Services, Implementing Group Policy, Securing Windows Servers Using Group, Policy Objects, Implementing Server Virtualization with Hyper-V, Implementing a Group Policy Infrastructure, Managing User Desktops with Group Policy, Managing User and Service Accounts, Maintaining Active Directory Domain Services, Configuring and Troubleshooting DNS, Configuring and Troubleshooting Remote Access, Installing, Configuring, and Troubleshooting the Network Policy Server Role, Implementing Network Access Protection, Optimizing File Services, Configuring Encryption and Advanced Auditing, Deploying and Maintaining Server Images, Implementing Advanced Network Services, Implementing Advanced File Services, Implementing Dynamic Access Control, Implementing Network Load Balancing, Implementing Failover Clustering, Implementing Failover Clustering with Hyper-V, Implementing Disaster Recovery, Implementing Distributed Active Directory, Domain Services Deployments, Implementing Active Directory Domain, Services Sites and Replication, Implementing Active Directory Certificate Services, Implementing Active Directory Rights Management Services, Implementing Active Directory Federation Services. (Duration- 8 weeks) **<u>Topic 3:</u> Linux Server-** Red Hat System Administration, Get Started with the GNOME Graphical Desktop, Manage Files Graphically with Nautilus, Get Help in a Graphical Environment, Configure Local Services, Manage Physical Storage I, Manage Logical Volumes, Monitor System Resources Manage System Software, Get Started with Bash, Basic job control techniques, Get Help in a Textual Environment	

		Establish Network Connectivity, Administer Users and Groups, Manage Files from the Command Line, Secure Linux File Access, Administer Remote Systems, Configure General Services, Manage Physical Storage, Install Linux Graphically, Manage Virtual Machines, Control the Boot Process, Deploy File Sharing Services, Secure Network Services, Automated Installations of Red Hat Enterprise Linux, Accessing the Command Line, Intermediate Command Line Tools, Regular Expressions, Pipelines, and I/O Redirection, Network Configuration and Troubleshooting, Managing Simple Partitions and File systems, Managing Flexible Storage with the Logical Volume Manager (LVM), Access Network File Sharing Services; NFS and CIFS, Managing User Accounts, Network User Accounts with LDAP, Controlling Access to Files, Managing SELinux, Installing and Managing Software, Managing Installed Services, Analyzing and Storing Logs, Managing Processes, Tuning and Maintaining the Kernel, System Recovery Techniques, Enhance User Security, Bash Scripting and Tools, File Security with GnuPG, Software Management, Network Monitoring, Route Network Traffic, Secure Network Traffic, NTP Server Configuration, System Monitoring and Logs, Centralized and Secure Storage, SSL encapsulated Web Services, Web Server Additional Configuration, Basic SMTP Configuration, Caching Only DNS Server, File Sharing with NFS, File Sharing with CIFS, File Sharing with FTP, Troubleshooting Boot Process **(Duration-8 weeks)** **Topic 4: Vmware Virtualization ESXI -** Implementing and Managing VM Ware Virtualization Solution, Introduction to VMware Virtualization, Introduce virtualization and vSphere components, Explain the concepts of server, network, and storage virtualization, Describe where vSphere fits into the cloud architecture, Install and use vSphere user interfaces, Describe the ESXi architecture and configure various ESXi settings, Creating Virtual Machines, Introduce virtual machines, virtual machine hardware and virtual machine files, Deploy a single virtual machine, VMware vCenter Server, Introduce vCenter Server architecture, Manage vCenter Server inventory objects and licenses, Configuring and Managing Virtual Networks, Describe, create, and manage a standard virtual switch, Describe and modify standard virtual switch properties, Configure virtual switch load balancing algorithms, Configuring and Managing Virtual Storage, Introduce storage protocols	

		and device names, Configure ESXi with iSCSI, NFS, and Fibre Channel storage, Create and manage VMware vSphere VMFS datastores, Introduce VMware vSphere Storage Appliance, Virtual Machine Management, Use templates and cloning to deploy virtual machines, Modify and manage virtual machines, Create and manage virtual machine snapshots, Perform VMware vSphere vMotion and vSphere Storage, Motion migrations, Create a vSphere vApp, Use VMware vCenter Converter™ Standalone to hotclone a system, Access and Authentication Control, Control user access through roles and permissions, Discuss ESXi host access and authentication, Integrate ESXi with Active Directory, Introduce VMware vShield products, Installing VMware Components, Introduce ESXi installation, Describe boot from SAN requirements, Describe vCenter Server hardware, software, and database requirements, Install vCenter Server (Windows based), Introduce vCenter Server Appliance, Install and configure vCenter Server Appliance, Use Image Builder to create an ESXi installation image, Use Auto Deploy to deploy a stateless ESXi host (Duration-2 weeks) **<u>Topic 5:</u> AWS-solution architect associate-** Identity Access Management(IAM), introduction, features, Components, Users, Roles, Groups, Policies, AWS Object Storage and CDN- S3 Glacier and CloudFront, S3 introduction, Data consistency model, Storage classes/Tiers, Versioning, Cross Region Replication, Lifecycle Management, Static Website Hosting, Transfer Acceleration, Logging, Events, Permissions, Tags, Requester Pay, Storage Management, CloudFront introduction, CloudFront Components, Origins, Behaviours, Invalidations, Error pages, Restrictions, Price classes, WAF, Snowball introduction, Snowedge introduction, Snowmobile introduction, Glacier introduction, EC2, EC2 instance types, EBS, EFS, Load Balancers, Autoscalling, IAM roles with EC2, Bootstrap Script, Snapshot, Maintenance Windows, Placement group, Key pairs, AMIs, Elastic Beanstalk, Lambda, Route53, Simple routing policy, Failover routing policy, Geolocation routing policy, Latency routing policy Weighted routing policy, VPC, Subnets, Route Table, Internet Gateway, NAT Instance, NAT Gateway, Security Group, Network ACL, Customer Gateway, Virtual Private Gateway, Elastic IP, Databases on AWS, DynamoDB introduction, DynamoDB components, Application	

		Services, SNS, SES, SQS, API Gateway, Lambda, Elastic Transcoder. (Duration-4 weeks) **<u>Topic 6:</u> ITIL-** Configuration Management, Objective, Configuration Items (CI), Configuration Management Activities, Configuration Management Planning, Configuration Identification, CMDB Development, CMDB Level of breakdown, CMDB Level of Detail (Attributes), Configuration Status Accounting, Configuration Control Configuration Verification And Audit, Configuration Management Benefits, Configuration Management v/s Asset Management, Incident Management, Scope of Incidents, Service Requests, Example of a priority coding system, Scheduling, Escalation, Functional Escalation Matrix, Incident Management Activities, Incident Management Process, Problem Management, Scope Of Problem Management, Known Error, Problem Management Activities, Problem Control, Error Control Proactive Problem Management, Tracking And Escalation Problem Reviews, Functions And Roles, Service Desk, Structure, Service Desk Personnel, How Are Incidents Reported? Activities, Management Reports, Change Management, Change Authorities, Standard Change, Inputs & output for Change Management, Activities, Recording, Change Classification, Change Management Implementation, Planning And Approval, Evaluation, Change Management Reporting, Change Management Analysis and Actions, Key Performance Indicators (KPI) Release Management, Release Management, Release Levels, Release Types, Definitive Software Library (DSL) Benefits, ITIL Model, Service Level Management, Identify, Service Level Requirements (SLR), Service Catalogue, Monitor, Service Level Achievement, Service Level Report, Capacity Management, Addresses, The three sub-processes, Continuity Management, Definition, Disaster, Activities, Business Impact Analysis (BIA), Risk Assessment, Prevention measures and recovery options, Review and Audit, Availability Management, Designing for Availability, Maintenance Management, Measuring and Reporting, Measurement, Component Failure Impact Analysis Matrix (CFIA), Security Management & Financial Management, Cost Types, Budgeting, Accounting, Charging Policy (Duration-2 weeks) Internship: 4 weeks	

		Key Reference Books 1. CCNA Certification Study Guide, volume 2 by Todd Lammle. 2. MCSA Windows server 2016, 3-in-1 complete study guide. 3. Red Hat Enterprise Linux 6 Administration: Real World Skills for Red Hat Administrators 4. AWS Certified Cloud Practitioner (CLF-C01) Cert Guide First Edition By Pearson Paperback – 15 August 2020 5. Cloud Computing made easy by Cary Landis and Dan W. Blacharski.	
		11. Quality Assurance: IQAC (Internal Quality Assurance Cell) is in place to oversee the Programme delivery mechanism and suggest changes specific to industry requirements. The quality of the programme will be ensured through strict monitoring by an executive committee including the Co-ordinator of the programme, the subject experts, Director. The Co-ordinator of the programme shall ensure the regular student feedback of courses, teachers and programme in the prescribed format towards the end of the semester and the same shall be analyzed to draw conclusions for effecting improvement. Periodical review meetings on the programme efficacy will be held in which the remarks of teachers on curriculum, syllabi and methods of teaching and evaluation will be given due importance. Moreover, the progress and the quality of the programme will be monitored by the Internal Quality Assurance Cell of AIIITS from the outcome and feedback of the learners as well as the proper documentation maintained in the Centre.	
		12. SLM: Self-Learning Material is available in English	