Course Title	**Virtual Systems and Services**
Course Code	**DI-421**
Credit Hours	3+1
Category	Domain Core
Prerequisite	CC-112: Programming Fundamentals
Co-Requisite	None
Follow-up	None
Course Description	**Introduction:** Virtualization in computing systems. **Virtualization:** Hardware and Software virtualization, hypervisor configurations, Vmware, Zen and Hyper-V, Dockers, Para-virtualized software components, VM architecture, virtualization structures, virtualization of CPU, memory and I/O devices, virtual clusters, VM migration, virtualization for data center automation, data center networking structure, VPN, network virtualization, configuration, management and limitations of virtual environments, future of virtualization. **Cloud Computing:** Definition, essential characteristics, history, benefits, risks and challenges, privacy, security and trust issues, introduction to Cluster and Grid computing, difference between Cluster, Grid and Cloud computing, Migrating to the Cloud, Service Models, SaaS, PaaS and IaaS, Deployment Models, Data Storage in Clouds, Delivery Models, Cost Metrics and Pricing Models, Service Quality Metrics, CloudSim, Cloud Management, Advanced Cloud Architectures, Inter Cloud Resource Management, Cloud Security Threats and Mechanisms, Disaster Recovery, Open Issues in Cloud computing. **Designing Cloud Based Solution:** Cloud Application Scalability, Cloud Resource Scheduling, Mobile Cloud Computing, Big Data Processing in Clouds, Characteristics of Big Data, Multimedia Cloud Computing, SDN, Fog Computing, and Cloud Gaming.
Text Book(s)	1. Handbook of Virtual Environments: Design, Implementation, and Applications (Human Factors and Ergonomics), Edited by Kay M Stanney, Lawrence Erlbaum Associates Virtual Reality Technology by GRIGORE 2. Cloud Computing: Concepts, Technology & Architecture by Ricardo Puttini, Thomas Erl, and Zaigham Mahmood 3. NIST Cloud Computing Reference Architecture: Recommendations of the National Institute of Standards and Technology (Special Publication 500-292)
Reference Material	