

PECE 3201 Data
Management, Protection
and Governance

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Teaching Scheme

Lectures: 3 Hrs/Week

Examination Scheme

In Semester: 50 marks

End Semester: 50 marks

Credits: 3

Course Objectives:

To facilitate the learner to –

1. Get acquainted with the high-level phases of data life cycle management.
2. Acquire knowledge about the various aspects of data storage, data availability, data protection.
3. Gain exposure to various solutions/reference architectures for various use-cases.
4. Understand the technical capabilities and business benefits of data protection.

Course Outcomes:

By taking this course, the learner will be able to –

1. Understand the data management world, challenges and best practices.
2. Compare various concepts and technologies for enabling data storage and high availability.
3. Illustrate various types of data threats and approaches to ensure data center security.
4. Explain the various concepts related to data protection.
5. Outline different standards for compliance and governance of data.
6. Understand various approaches for designing data intensive enterprise applications and industry standard solutions in data management.

ABOUT VERITAS

Veritas Technologies is a global leader in data protection and availability. Over 50,000 enterprises—including 99 of the Fortune 100—rely on us to abstract IT complexity and simplify data management. Veritas Enterprise Data Services Platform automates the protection and orchestrates the recovery of data everywhere it lives, ensures 24/7 availability of business-critical applications, and provides enterprises with the insights they need to comply with evolving data regulations. With a reputation for reliability at scale and a deployment model to fit any need, Veritas supports more than 500 data sources and over 150 storage targets, including 60 clouds. Learn more at www.veritas.com. Follow us on Twitter at [@veritastechllc](https://twitter.com/veritastechllc).

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Unit 1: Introduction to data life cycle management (DLM)

(06)

- Goals of data life cycle management
- Challenges involved
 - o Volume of data source
 - o Ubiquity of data locations
 - o User demand for access
- Stages of data life cycle - creation, storage, usage, archival, destruction
- Risks involved without DLM, benefits, best practices

Unit 2: Data storage and data availability

(08)

- Storage technology
 - o Hard Disk Device (HDD), Solid State Devices (SSD), memory devices
 - o Data access - block, files, object
 - o Data center End to End View – overview of complete stack including storage, network, host, cluster, applications, virtual machines, cloud storage
 - o Storage virtualization technologies - RAID level, storage pooling, storage provisioning
 - o Advance topics in storage virtualization – storage provisioning, thin-provisioning
 - o Cloud storage – S3, glacier, storage tiering
- High Availability
 - o Introduction to high availability
 - o clustering, failover, parallel access

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Unit 3: Data Threats and Data center security

(07)

- Type of Threats
 - o Denial of Service (DoS), man in the middle attacks
 - o Unintentional data loss
 - o Repudiation
 - o Malicious attacks to steal data
- Introduction to Ransomware
- Understanding, Identification and Threat modelling tools
- Security
 - o Authorization and authentication - access control, Transport Layer Security (TLS), key management, security in cloud
 - o Design and architecture considerations for security

Unit 4: Introduction to data protection

(08)

- Introduction
 - o Need for data protection
 - o basic of back-up/restore
- Snapshots for data protection, copy-data management (cloning, DevOps)
- De-duplication
- Replication
- Long Term Retention - LTR
- Archival
- Design considerations
 - o System recovery
 - o Solution architecture
 - o Backup v/s Archival
 - o media considerations and management (tapes, disks, cloud)
 - o challenges with new edge technology (cloud, containers)

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Unit 5: Data regulation, compliance and governance

(06)

- Regulations requirements and Privacy Regulations
 - o The Health Insurance Portability and Privacy Act of 1996 (HIPPA)
 - o PII (Personally Identifiable Information)
 - o General Data Protection Regulation (GDPR)
- Information Governance
 - o Auditing
 - o Legal Hold
 - o Data classification and tagging (Natural Language Processing)
- India's Personal Data Protection bill

Unit 6: Applications uninterrupted

(07)

- Understand data management aspects of traditional and new edge applications
- Reference architecture/best practices (*pick 2-3 case studies from below topics*)
 - o Transactional Databases (Oracle, MySQL, DB2)
 - o NoSQL Databases (MongoDB, Cassandra)
 - o Distributed applications (micro service architectures)
 - o Cloud applications – Platform as Service (PaaS), Software as Service (SaaS), Kubernetes
 - o Multi-Tiered applications
 - o ETL workloads
 - o Data analytics (AI/ML)

Textbooks:

1. Robert Spalding, '**Storage Networks: The complete Reference**'.
2. Vic (J.R.) Winkler, '**Securing The Cloud: Cloud Computing Security Techniques and Tactics**', Syngress/Elsevier - 978-1-59749-592-9

Reference Books:

1. Martin Kleppmann, '**Designing Data-Intensive Applications**', O'Reilly

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<https://www.dataworks.ie/5-stages-in-the-data-management-lifecycle-process/>

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