

***LESSON PLAN***

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| ***SUBJECT TITLE*** | | **STORAGE AREA NETWORKS** | | | |
| ***SUBJECT CODE*** | | **18CS822** | | | |
| ***ACADEMIC YEAR*** | | **2022** | | **BATCH** | **2018** |
| ***SEMESTER & SECTION*** | | **VIII B** | | | |
| ***IA MARKS*** | | **40** | ***EXAM MARKS*** | | **60** |
| ***NUMBER OF LECTURE HOURs/WEEK*** | | **04** | ***TOTAL NUMBER OF LECTURE HOURS*** | | **40** |
| ***FACULTY NAME*** | | **SANJAY P K** | ***NO. OF TIMES HANDLED*** | | **03** |
| ***COURSE LEARNING OBJECTIVES*:** This course will enable students to | | | | | |
| 1. Evaluate storage architectures | | | | | |
| 1. Define backup, recovery, disaster recovery, business continuity, and replication | | | | | |
| 1. Examine emerging technologies including IP-SAN | | | | | |
| 1. Understand logical and physical components of a storage infrastructure | | | | | |
| 1. Identify components of managing and monitoring the data center | | | | | |
| 1. Define information security and identify different storage virtualization technologies | | | | | |
| **Course Outcomes:** At the end of this course, students are able to: | | | | | |
| CO1 | Examine the Storage Area Networks characteristics, components and storage architectures | | | | |
| CO2 | Exemplify the concept of RAID and their suitability for different application environments | | | | |
| CO3 | Analyze file sharing operations on NAS and IP-SAN of the different networks | | | | |
| CO4 | Inspect different back up topologies, techniques, architecture, methods and back up in NAS Environment | | | | |
| CO5 | Illustrate the concepts of business continuity and disaster recovery in a storage infrastructure | | | | |
| CO6 | Demonstrate the Knowledge of Securing the local and remote replication and securing Storage Infrastructure | | | | |

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| **COURSE**  **OUTCOMES** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** | **PSO4** |
| **CO1** | 1 |  |  |  |  |  |  |  |  |  |  | 1 | 1 |  | 1 |  |
| **CO2** | 1 | 2 | 1 | 1 |  |  |  |  |  |  |  | 1 | 1 |  | 1 |  |
| **CO3** | 1 | 1 |  |  |  |  |  |  |  |  |  | 1 | 1 |  | 1 |  |
| **CO4** | 1 |  |  |  |  |  |  |  |  |  |  | 1 | 1 |  | 1 |  |
| **CO5** | 1 |  |  |  |  |  |  |  |  |  |  | 1 | 1 |  | 1 |  |
| **CO6** | 1 |  |  |  |  |  |  |  |  |  |  | 1 | 1 |  | 1 |  |

**CO-PO MATRIX**

**DELIVERY PLAN WITH DETAILS**

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| **MODULE – 1** | | | | | | | | |
| **Lecture**  **#** | **Topic** | | | **Mode of Delivery**  (Pls Tick **√**) | | | | **Date of Delivery** |
| 1 | 2 | 3 | 4 |  |
| 1 | Information Storage & Evolution of Storage Architecture | | |  |  |  |  |  |
| 2 | Data Center Infrastructure, Virtualization & Cloud Computing | | |  |  |  |  |  |
| 3 | Application Database Management System (DBMS) | | |  |  |  |  |  |
| 4 | Host (Compute), Connectivity &Storage | | |  |  |  |  |  |
| 5 | Disk Drive Components & Disk Drive Performance | | |  |  |  |  |  |
| 6 | Host Access to Data | | |  |  |  |  |  |
| 7 | Direct-Attached Storage | | |  |  |  |  |  |
| 8 | Storage Design Based on Application | | |  |  |  |  |  |
| **Textbook : and chapter : Textbook1 : Ch.1.1 to 1.4, Ch.2.1 to 2.10** | | | | | | | | |
| **#HOURSTaken** | |  | **COs**  **Covered** | | | | |  |
| **MODULE – 2** | | | | | | | | |
| **Lecture**  **#** | **Topic** | | | **Mode of Delivery**  (Pls Tick **√**) | | | | **Date of Delivery** |
| 1 | 2 | 3 | 4 |  |
| 1 | RAID Implementation Methods, RAID Array Components | | |  |  |  |  |  |
| 2 | RAID Techniques, RAID Levels | | |  |  |  |  |  |
| 3 | RAID Impact on Disk Performance | | |  |  |  |  |  |
| 4 | RAID Comparison | | |  |  |  |  |  |
| 5 | Components of an Intelligent Storage System | | |  |  |  |  |  |
| 6 | Types of Intelligent Storage Systems | | |  |  |  |  |  |
| 7 | Fibre Channel: An Overview | | |  |  |  |  |  |
| 8 | Components of FC SAN. | | |  |  |  |  |  |
| **Textbook : and chapter : Textbook1 : Ch.3.1 to 3.6, Ch. 4.1, 4.3, Ch. 5.1 to 5.3** | | | | | | | | |
| **#HOURSTaken** | |  | | **COs**  **Covered** | | | |  |
| **MODULE – 3** | | | | | | | | |
| **Lecture**  **#** | **Topic** | | | **Mode of Delivery**  (Pls Tick **√**) | | | | **Date of Delivery** |
| 1 | 2 | 3 | 4 |  |
| 1 | iSCSI, FCIP | | |  |  |  |  |  |
| 2 | General-Purpose Servers versus NAS Devices, | | |  |  |  |  |  |
| 3 | Benefits of NAS | | |  |  |  |  |  |
| 4 | File Systems and Network File Sharing | | |  |  |  |  |  |
| 5 | Components of NAS, NAS I/O Operation | | |  |  |  |  |  |
| 6 | NAS implementations | | |  |  |  |  |  |
| 7 | NAS File-Sharing Protocols | | |  |  |  |  |  |
| 8 | Factors Affecting NAS Performance | | |  |  |  |  |  |
| **Textbook : and chapter : Ch.6.1, 6.2, Ch. 7.1 to 7.8** | | | | | | | | |
| **#HOURSTaken** |  | | | **COs**  **Covered** | | | |  |
| **MODULE – 4** | | | | | | | | |
| **Lecture**  **#** | **Topic** | | | **Mode of Delivery**  (Pls Tick **√**) | | | | **Date of Delivery** |
| 1 | 2 | 3 | 4 |  |
| 1 | Information Availability | | |  |  |  |  |  |
| 2 | BC Terminology, BC Planning Life Cycle | | |  |  |  |  |  |
| 3 | Failure Analysis | | |  |  |  |  |  |
| 4 | Business Impact Analysis, BC Technology Solutions | | |  |  |  |  |  |
| 5 | Backup Purpose & Backup Considerations | | |  |  |  |  |  |
| 6 | Backup Granularity, Recovery Considerations, Backup Methods, Backup Architecture, | | |  |  |  |  |  |
| 7 | Backup and Restore Operations | | |  |  |  |  |  |
| 8 | Backup Topologies, Backup in NAS Environments | | |  |  |  |  |  |
| **Textbook : and chapter:Textbook1 : Ch.9.1 to 9.6, Ch. 10.1 to 10.9** | | | | | | | | |
| **#HOURSTaken** | |  | | **COs**  **Covered** | | | |  |
| **MODULE – 5** | | | | | | | | |
| **Lecture**  **#** | **Topic** | | | **Mode of Delivery**  (Pls Tick **√**) | | | | **Date of Delivery** |
| 1 | 2 | 3 | 4 |  |
| 1 | Replication Terminology, Uses of Local Replicas & Replica Consistency | | |  |  |  |  |  |
| 2 | Local Replication Technologies | | |  |  |  |  |  |
| 3 | Tracking Changes to Source and Replica | | |  |  |  |  |  |
| 4 | Restore and Restart Considerations & Creating Multiple Replicas | | |  |  |  |  |  |
| 5 | Modes of Remote Replication | | |  |  |  |  |  |
| 6 | Remote Replication Technologies | | |  |  |  |  |  |
| 7 | Information Security Framework and Risk Triad | | |  |  |  |  |  |
| 8 | Storage Security Domains. Security Implementations in Storage Networking | | |  |  |  |  |  |
| **Textbook : and chapter : Textbook1 : Ch.11.1 to 11.7, Ch. 12.1, 12.2, Ch. 14.1 to 14.4** | | | | | | | | |
| **#HOURSTaken** | |  | | **COs**  **Covered** | | | |  |

***(Note:*** Mode of Delivery 1:Black Board 2:PPT 3:Video 4:Demo/Hands-on)

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| **Text Books:**  1. EMC Education Services, **“Information Storage and Management**”, Wiley India Publications, 2009.  ISBN: 9781118094839 |
| **Reference Books:**  1.Paul Massiglia, Richard Barker, **"Storage Area Network Essentials: A Complete Guide to Understanding and Implementating SANs Paperback",** 1st Edition, Wiley India Publications, 2008 |

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| **Sl.No** | **Planned Subject Activity** | **Date of Conduction** | **Remarks** |
| **1.** | Augmentation Talk |  |  |
| **2.** | Subject Activity |  |  |
|  |  |  |  |

**INTERNAL/ASSIGNMENT/QUIZ SCHEDULE**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **TEST and QUIZ** | | | **COs and Portions Covered** | | | **ASSIGNMENT** | |
| **Test# and Quiz#** | **DATE** | **CO** | | **Modules** | **Assignment#** | | **DATE** |
| **T1 & Q1** |  |  | |  | **A1** | |  |
| **T2 & Q2** |  |  | |  | **A2** | |  |
| **T3 & Q3** |  |  | |  | **A3** | |  |

**SUMMARY**

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| **Signatures**  **With Date** | **Faculty:** | **Total #HOURS** | **Allotted** | **Taken** |
| **HoD:** |  |  |
| **Remarks** |  | | | |

**PAC- Review**

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| --- | --- | --- | --- |
| **Meeting #** | **Date** | **Actions** | **Remarks** |
| **1.** |  | CO-PO, Gap identification, Activities planned |  |
| **2.** |  | Assignments, Question bank, Lecture Notes, Previous Year University Question paper. |  |
| **3.** |  | 1st Test Portion coverage, InternalQuestion paper pattern. |  |
| **4.** |  | 2nd Test Portion coverage, Internal Question paper pattern. |  |
| **5.** |  | CO-PO Attainment and Gap Analysis |  |
| **Any other discussion:** | |  | |

**Faculty Course coordinator PAC HOD**