

# GUJARAT TECHNOLOGICAL UNIVERSITY

**Subject Name: Data Centre Management**  
**Subject Code: 3735102**

**Semester: III**

**Type of course:** M.E. Computer Engineering (IT systems and Network Security)

**Prerequisite:**

- Understanding of Network Infrastructure management
- Understanding of Server Management and troubleshooting
- Understanding of system Resource Management
- Understanding of Information Security

**Rationale:** NA

**Teaching and Examination Scheme:**

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	PA (V)	PA (I)		
3	2#	0	4	70	30	30	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment;

**Content:**

Sr. No.	Content	Total Hrs	% Weightage
1	Data center Architecture	1	2
2	Data center Requirements	1	2
3	Data center prerequisites	1	2
4	Required Physical Area for Equipment and Unoccupied Space	1	2
5	Required power to run all the devices	1	2
6	Required cooling and HVAC Required weight	1	2
7	Required Network bandwidth	1	2
8	Budget Constraints	1	2
9	Selecting a Geographic Location Safety from Natural hazards	1	2
10	Safe from Manmade disaster	1	2
11	Availability of local Technical talent, Abundant and Inexpensive Utilities	1	2
12	Selecting an Existing building	1	2
13	Data Center design	1	2
14	Characteristics of an Outstanding Design	1	2
15	Guidelines for Planning a Data Center	1	2
16	Data Center structures	1	2
17	Raised Floor Design and Deployment, Design and Plan against Vandalism	1	2
18	Data center design case study	1	2

19	Modular Cabling Design, Points of Distribution	1	2
20	ISP Network Infrastructure	1	2
21	ISP WAN Links	1	2
22	Data Center Maintenance	1	2
23	Network Operations Center, Network Monitoring	1	2
24	Datacenter physical security	1	2
25	Data center Logical security	1	2
26	Data center Consolidation, Reasons for data center Consolidation, Consolidation opportunity, Server consolidation, Storage Consolidation, Network Consolidation, Service Consolidation, Process Consolidation, Staff Consolidation, Data Consolidation phases	1	4
27	Data center servers, Server Capacity Planning	1	4
28	System Management Best Practices, Server Cluster Best Practices, Data Storage Best Practices, Network Management Best Practices, Documentation Best Practices	1	2
29	Security Guidelines Internet security, Source Security Issues	1	2
30	Best Practices for System Administration, System Administration Work Automation	1	4
31	Device Naming, Naming Practices, NIS, DNS, LDAP, Load balancing, Terminology, Advantages, Types of load balancing, Implementing a Network with Load-Balancing Switches	1	4

**Reference Books:** -Administering Data Centers: Servers, Storage and Voice over IP, Kailash Jayaswal  
 -Data center fundamentals, Mauricio Arregoces, Maurizio Portol

**Course Outcome:**

After learning the course the students should be able to:

- Manage Server Systems and Data Centres Infrastructure Management
- Utilize the Storage, Bandwidth, Efficiency of systems and other resources for Data centre.
- Monitoring the Networks and Resources.
- Planning for Flexible resource allocation.

**List of Experiments: (with Open Ended Problems)**

- Monitoring the cluster using Nagios/Ganglia tools.
- Resource allocation to clients on Cloud/cluster.

**Major Equipments:**

- Linux (Kali/Fedora)
- Network Simulators
- VMWare Workstation
- ESXI Server
- Router
- Switch

**List of Open Source Software/learning website:**

- Nagios
- Ganglia
- Untangle
- ClearOS

**Review Presentation (RP):** The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website