Course Name: DataCenter Design & Administration **Course Code: ITEC455**

General Information						
Course Code	**ITEC455**	**Level/Year**	**8th / 4th**	**Required (R) / Selected Elective (SE)**		**Required**
Credit Hours	**Theory**	**2**	**Lab**	**1**	**Total**	**3**
Prerequisites	**ITEC454**	**Course Coordinator**		**Ms.Masrath Sulthana**		
Corequisites	**--**	**Track Leader**		**Dr. Ali Tahir**		

Course Description

This course provides an in-depth exploration of the principles and practices involved in designing and managing modern datacenters. Students will learn about the critical components of datacenter infrastructure, including power, cooling, networking, and storage systems. The course covers best practices for datacenter design, focusing on efficiency, scalability, and sustainability. Topics include virtualization, cloud computing, disaster recovery, and security measures to protect datacenter assets. Through hands-on labs and real-world case studies, students will gain practical experience in configuring and maintaining datacenter environments. By the end of the course, students will be equipped with the knowledge and skills necessary to design, implement, and manage robust and efficient datacenters.

Course Objectives : On completion of the course, the student will be able to:

- Gain a thorough understanding of the fundamental concepts and principles of datacenter design and administration.
- Learn to manage critical components of datacenter infrastructure, including power, cooling, networking, and storage systems.
- Identify best practices, and security requirements for designing efficient, scalable, and sustainable datacenters.
- Implement virtualization and cloud computing solutions within a datacenter environment.
- Implement effective backup and recovery strategies to protect data and ensure business continuity.
- Develop and implement effective disaster recovery strategies to ensure business continuity.
- Apply security measures to protect datacenter assets from threats and vulnerabilities.

Course Contents

List of Topics	Weeks
CH 1: Introduction to Datacenter Design and Administration	1,2,3
CH 2: Datacenter Infrastructure	4,5,6
CH 3: Designing Efficient, Scalable, and Sustainable Datacenters	7,8,9
CH 4: Virtualization and Cloud Computing Solutions	10,11,12
CH 5: Disaster Recovery Strategies, Security Requirements, Measures, and Best Practices	13,14,15

Textbook

Data Center Handbook: Plan, Design, Build, and Operations of a Smart Data Center, 2nd Edition, By Hwaiyu Geng, John Wiley & Sons, 2021, ISBN 10: 1119597501, ISBN 13: 9781119597506.
Infrastructure Architecture Essentials for Data Center and Cloud, 1st Edition, By Shankar

Kambhampaty, Independently published, 2022, ISBN 10: 1492055212, ISBN 13: 9781492055211.
Data Center Virtualization Fundamentals, 1st Edition, By Gustavo A. A. Santana, Cisco Press, 2013, ISBN 10: 8786300466, ISBN 13: 9798786300469.

Reference Materials

Cloud Data Center Network Architectures and Technologies, 1st Edition, By Lei Zhang, Le Chen, 2021, CRC Press, ISBN 10: 0367695707, ISBN 13: 9780367695705.

Cisco Data Center Fundamentals, 1st Edition, By Somit Maloo, Iskren Nikolov, 2023, Cisco Press, ISBN 10: 0137638248, ISBN 13: 9780137638246.

Administering Data Centers: Servers, Storage, And Voice over IP, 1st Edition, By Kailash Jayaswal, John Wiley & Sons, 2006, ISBN 10: 047177183X, ISBN 13: 9780471771838.

Course Learning Outcomes

CLO	Description	Mapped PI
CLO#01	**Define** the fundamental concepts and principles of datacenter design and administration.	PI 1.1
CLO#02	**Explain** critical components of datacenter infrastructure, including power, cooling, networking, and storage systems.	PI 1.2
CLO#03	**Identify** best practices, and security requirements for designing efficient, scalable, and sustainable datacenters.	PI 1.3 PI 6.1
CLO#04	**Implement** virtualization and cloud computing solutions within a datacenter environment.	PI 2.3
CLO#05	**Evaluate** effective disaster recovery strategies to ensure business continuity.	PI 2.4
CLO#06	**Apply** security measures to protect datacenter assets from threats and vulnerabilities.	PI 6.3 PI 6.4

CLO-PI-SO Mapping

	SO-1	SO-2	SO-3	SO-4	SO-5	SO-6
CLO#01	PI 1.1	-	-	-	-	-
CLO#02	PI 1.2	-	-	-	-	-
CLO#03	PI 1.3	-	-	-	-	PI 6.1
CLO#04	-	PI 2.3	-	-	-	-
CLO#05	-	PI 2.4	-	-	-	-
CLO#06	-	-	-	-	-	PI 6.3 PI 6.4